CIBSE JOURNAL

The official magazine of the Chartered Institution of Building Services Engineers

July 2010

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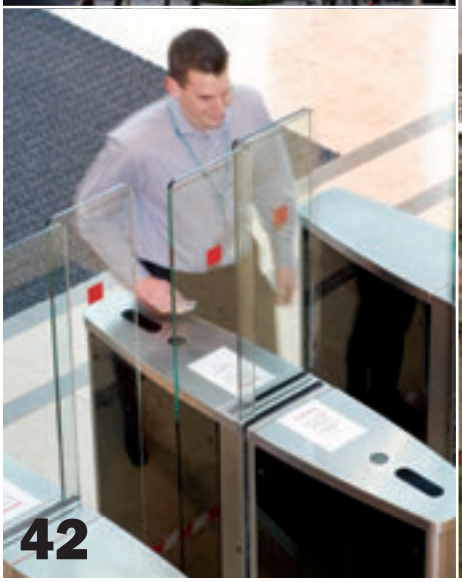

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Editorial
Editor: Bob Cervi
Tel: 01223 273520
Email: bcervi@cibsejournal.com
Reporter: Carina Bailey
Tel: 01223 273521
Email: cbailey@cibsejournal.com
Senior designer: David Houghton

Advertisement Sales
Head of business development: Aaron Nicholls
Tel: 020 7880 8547
Email: aaron.nicholls@redactive.co.uk
Sales manager: Jim Folley
Tel: 020 7324 2786
Email: jim.folley@redactive.co.uk
Sales Executive: Darren Hale
Tel: 0207 880 6206
Email: darren.hale@redactive.co.uk
Senior recruitment sales: Prashant Desai
Tel: 020 7324 2787
Email: prashant.desai@redactive.co.uk
Advertising production: Jane Easterman
Tel: 020 7880 6248
Email: jane.easterman@redactive.co.uk

For CIBSE
Publishing co-ordinator: Nicola Hurley
Tel: 020 8772 3697
Email: nhurley@cibse.org

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From the editor

Embodying good practice

Cuts, cuts and more cuts. Inevitably our news pages are full of such financial doom and gloom. And this is even before we know the details of the full impact of last month's Emergency Budget from the new coalition government in the UK, which plans to slash the spending of Whitehall departments and freeze council taxes.

But, despite these ongoing pressures, the industry continues to teem with good practice and innovative engineering solutions. For example, our two features on 'embodied carbon', starting on page 31, highlight the importance of giving future generations an enduring legacy – not just in terms of sustainable buildings but by providing structures that will last and will also provide flexibility of use.

As David Telford of hurleypalmerflatt argues, we need to 'design-in flexibility in use' to future-proof our buildings to cope with new and different technologies, and changes in their operation. In tandem with this approach, it is also important to make extensive use of passive techniques, so that we do not become overreliant on fitted technologies.

Another aspect of this overreliance is that it also potentially increases the proportion of carbon 'embodied' in our developments. Indeed, as property developer British Land has found (page 32), the more operationally efficient a building becomes, the higher the level of embodied carbon in its overall carbon footprint will be.

If we are serious about leaving a sustainable legacy in the built environment, we need to start paying more attention to the whole lifecycles of our developments; and we need to look to reduce the impact of the raw materials used – including their extraction, manufacture, assembly, installation, disassembly, deconstruction and/or decomposition (to borrow consultancy Deloitte's definition of non-operational embodied carbon).

This is certainly a tall order. But establishing a product's true carbon footprint is something that the manufacturing sector is trying to get to grips with; and it is to British Land's credit that it is attempting to incorporate this knowledge and make public the carbon footprint analysis of its whole property portfolio.

> **If we are serious about our sustainable legacy, we must pay more attention to the whole lifecycles of developments**

The government is promising to promote innovation via its proposed 'green investment bank'. It remains to be seen whether this will unleash the coffers of the private sector, as ministers hope that it will. But we clearly do have the commitment of Energy and Climate Change Secretary Chris Huhne, a Liberal Democrat, to a 'green deal' for consumers: the new Energy Bill will take forward the previous Labour government's plans to encourage more energy efficient homes via a pay-as-you-save scheme. A 'smart grid' will also be developed for the supply and demand of electricity, according to the government.

Whatever the economic climate, the industry must continue to seek to innovate, and to promote good practice. So let us know about your good engineering solutions – the *Journal* is always keen to share these with the wider industry.

Bob Cervi, Editor
bcervi@cibsejournal.com

News in Brief

Funds for social housing

Up to £200m worth of design and construction projects for mixed-use affordable housing developments have been made available by a consortium of UK housing associations. The Blue Skies Consortium consists of 16 housing groups in the East Midlands and beyond. Projects will be divided into two different value bands – those above £1m and those less than this amount. **www.blueskiesconsortium.org.uk**

Oxfordshire cuts projects

Oxfordshire County Council is reviewing up to £500m worth of new build and maintenance projects it had planned to implement in the next five years. Government cuts have led the authority to scrutinise a number of projects, such as extensions to schools, and new schools linked to new developments. **www.oxfordshire.gov.uk**

Crossrail tenders invited

Crossrail has invited bids for two projects. The construction of the new Broadgate Ticket Hall at London's Liverpool Street Station includes building a three-storey substation. Crossrail is also looking for contractors to refurbish the Connaught Tunnel. **www.crossrail.bravosolution.co.uk**

New wind speed predictor

Scientists at the University of Exeter have created what they claim is the first comprehensive future weather files that include a realistic representation of wind speed and direction. They are compatible with common building simulation software and allow engineers to compare a typical year in the 2020s with a typical year in the 2050s. **www.ex.ac.uk/cee/prometheus**

Green role for H&S staff

New research from NEBOSH suggests that more than half of health and safety managers are now responsible for environmental issues at work. The health, safety and environmental qualifications provider analysed 100 H&S job adverts and 55% mentioned environmental management. **www.nebosh.org.uk**

Low carbon policy details unveiled amid cash fears

The software for Part L 2010 of the Building Regulations has finally been released to industry. It came as the long-awaited definition of zero carbon homes was also due to be unveiled.

The new Part L National Calculation Method modelling guide incorporates a number of changes, including a new set of fuel emission factors taken from data published in SAP 2009.

Meanwhile, the zero carbon homes definition was due to be published at the end of June, after the *Journal* went to press.

The advisory body that has been working on the definition on behalf of central government, the Zero Carbon Hub, was also reported last month to be facing the loss of Department for Communities and Local Government funding.

The Housing Minister, Grant Shapps, was rumoured to be planning to cut public funding for the Hub once a suitable definition has been published. Last month's Emergency Budget, which announced plans to cut funding for government departments by up to 25%, will hit CLG, which supports the Hub.

However, Hywel Davies, technical director of CIBSE and a member of the Zero Carbon Hub working group on the definition of zero carbon, said: 'We certainly understand there are pressures on CLG to achieve more with less money, but we believe it must resist the temptation to do things on the cheap.'

CIBSE explains Part L 2010

CIBSE is holding a one-day conference focusing on the updates to Part L 2010. Speakers will include Paul DeCort of the Department for Communities and Local Government, Paul Davidson of BRE, and Nick Cullen, partner, Hoare Lea. The conference will take place on 19 October in London, with the full programme and venue to be confirmed.

For more information and to book, visit: www.cibsetraining.co.uk/conferences – save £50 with the early bird rate, available till 16 July.

HCA to shed projects in £230m squeeze

The Homes and Communities Agency (HCA) will have to cut its budget by £230m under the government's initial £6bn cuts plan.

The move will see the housing and regeneration body slicing £100m from its National Affordable Housing Programme (NAHP), £50m from the second round of its Kickstart programme, which was set up to help stalled projects, and £50m from its Housing Market Renewal scheme, which represents a reduction on the allocations announced in December and is now subject to consultation.

A complete hold was also placed on all uncommitted spending for all programmes until details of the emergency Budget were revealed.

Efficiency savings in running costs of 10% – in addition to the existing 3% target for operating costs and 2% cash standstill – will also have to be made this financial year. The HCA said it will achieve this through 'job vacancy control, reducing its use of consultants, reducing research and travel costs'. But the Treasury has indicated that it will 'recycle' £170m of the expected £500m of government savings back to the HCA to reinvest in social rented housing.

For more on cuts, see the News Analysis on page 20

Redevelopment for Russian airport

Pulkovo Airport in St Petersburg is being completely redeveloped in a euro 1bn project. Works include the creation of a new terminal building and pier, a hotel, business centre and office developments, as well as extensive refurbishment to the existing infrastructure. Phase 1 of the 30 year contract should be complete by 2013. The lead design consultant is multi-disciplinary group Ramboll UK. The architect is Grimshaw.

Low carbon sacrificed for good of economy, says CIC

The Construction Industry Council (CIC) praised the government for not announcing more immediate cuts to capital programmes. But it fears the planned VAT rise in Britain could send the retrofitting sector into the 'black economy' and hinder efforts to achieve climate change targets.

The 20% rate of VAT, due to take effect in January, was announced by the Chancellor, George Osborne, in his Emergency Budget last month.

Although no further cuts to capital spending were announced above and beyond those already made public, Osborne said a Spending Review will be held on 20 October, detailing public spending beyond 2011.

Separately, the Department for Education confirmed that the Building Schools for the Future programme was being reviewed, with further details to follow.

Graham Watts, chief executive of the CIC, a forum for professional bodies in the sector, said the Budget was unlikely to worsen the economic indicators for the construction industry in 2010/11 or 2011/12.

But he told the *Journal*: 'The "Achilles heel" for construction might be the impact that an increase in VAT will have on retrofitting existing buildings for greater energy efficiency and to reduce carbon emissions – the additional increase is likely to deter some owners from going ahead with retrofitting work and has the potential for taking more such work in the domestic sector into the black economy. [The VAT rise] is unlikely to make the achievement of climate change targets any easier.'

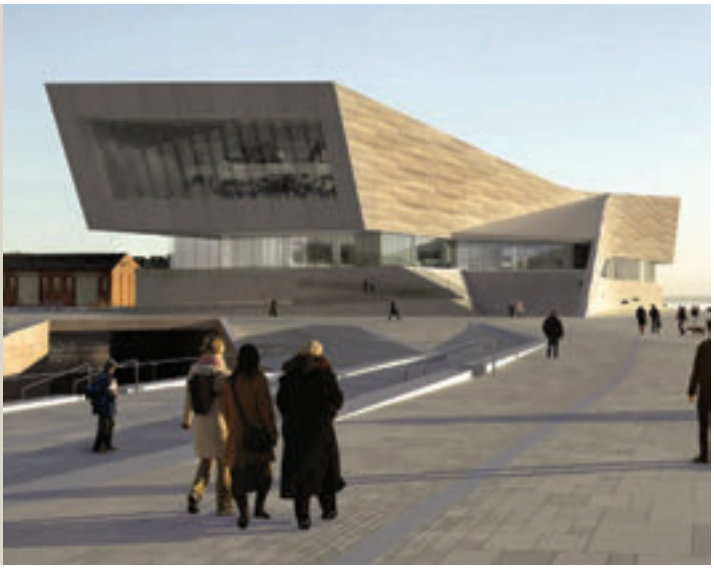
The Renewable Energy Association (REA) said the Budget had left key questions unanswered for the deployment of renewables.

However, the Budget confirmed that a Green Investment Bank to stimulate investment in low carbon industries would be taken forward.

It also pledged a 'green deal' to encourage households to make energy efficiency improvements, under the Energy Security and Green Economy Bill.

Design award for Museum of Liverpool

The Scottish Design Awards have now been announced, with multi-disciplinary consultant Buro Happold scooping two categories – it was winner of the Engineering Design Award for its Museum of Liverpool project (pictured), and also won the Sustainable Design Award for its design of the Queens University Library in Belfast. **www.scottishdesignawards.com**



Colleges win £50m funding despite cuts

The first round of £6bn cuts announced by the coalition government will see £500m reinvested, with further education colleges set to receive a lump sum for building projects.

Around 150 colleges that have yet to significantly benefit from the capital programme will each receive about £225,000 under a £30m Renewal Grant.

The Department for Business, Innovation and Skills said that a further £20m will be made available to colleges through an Enhanced Renewal Grant.

Colleges will have the opportunity to add to their Renewal Grant by bidding to build their total allocation to £1m. Colleges will be expected to attract additional private finance, providing final projects of significant value.

Criteria have been set for colleges wishing to submit a bid for a share of the funding. These include:

- The condition of the college and its facilities;
- The benefits to learners; and
- How it will add to the regeneration of local communities.

The college submitting the bid cannot have received more than £5m of funding for building projects in the past from the Skills Funding Agency (formerly the Learning and Skills Council). The bid also needs to show that the building project can be completed by September 2011.

The government also announced £150m to fund 50,000 new apprenticeship places, focused on small and medium enterprises; and £170m to safeguard the delivery of around 4,000 otherwise unfunded social rented homes to start on site this year.

Engineering sector shines in Queen's honours

Several professionals have been honoured for the part they have played in furthering the success of the sector, including:

Mark Andrews, formally the chief executive of NG Bailey, who received an OBE for his services to apprenticeships and training in the construction industry;

William Dunster, founder of ZEDfactory, who received an OBE for services to sustainable housing design;

Ronald Gainsford, chief executive of the Trading Standards Institute, who also received an OBE, awarded in recognition of his services to consumers and business;

Professor David Gann, chairman in technology and innovation management at Imperial College London, who received a CBE for his services to engineering;

Douglas Edwin, formally chairman of Crossrail, who received a CBE for his services to civil engineering;

Nelson Olawale Ogunshakin, chief executive of the Association for Consultancy and Engineering, who received an OBE for his services to construction and engineering industries;

Deborah Smith, director of the Building Research Establishment, who received an OBE for her services to fire safety;

Robert Steadman, vice-president of the Royal Academy of Engineering, who received a CBE for his services to engineering;

Jean Venables, president of the Institution of Civil Engineers, who received a CBE in honour of his services to civil engineering; and

Sarah Webb, chief executive of the Chartered Institute of Housing, who received a CBE for her services to the housing sector.

To see the list of recipients in full, visit **www.direct.gov.uk**

Leave out the luxury, says Morrell

Paul Morrell, the government's chief construction adviser, has warned architects that they need to produce less extravagant designs to take account of spending cuts.

Against a backdrop of fierce reductions in spending, the so-called construction czar has stated that the industry needs to identify savings 'on drawing boards, not building sites'.

Morrell told *Building* magazine: 'This is the product of a constructive dialogue between designers and end-users, concentrating on outcomes rather than outputs.

'This means that buildings must certainly be spaces where people can do their best work, but we should stop at the point at which further cost does not add sufficiently to utility or client satisfaction.'

Laing rejects claims of Middle East closure plan

Laing O'Rourke has denied reports that it plans to close its division in the Middle East.

Media reports have attributed an internal source, returning to the UK from the company's base in the Gulf, as stating that the British company is to drastically cut its global workforce

But a spokesman insisted to the *Journal* that 'Laing O'Rourke is not closing its Middle East operations'.

The company set up operations in the Middle East in 2006 after relaunching the business in three separate global divisions: Europe, Australasia and the Middle East. In 2009 its turnover in the region was more than £800m – double the previous year.

● Building services group Scott Wilson is declining to comment on reports that it is in takeover talks with two consultants in the United States.

A few weeks ago the building services group confirmed to the Stock Exchange that it had received at least one approach for the company.

Prevailing wind 'could create 250,000 jobs'

The European wind energy sector could generate more than 250,000 new jobs in Europe in the next few years, according to industry estimates.

Offshore wind, electricity grids, and the training and education of more engineers and technical staff, are critical to creating new jobs, according to the European Wind Energy Association (EWEA).

Christian Kjaer, the EWEA's chief executive, said: '[We expect] strong growth in wind energy employment in Europe over the coming years to 280,000 by 2015 and 450,000 by 2020. That is, on average, 450 new European wind energy jobs per week over the next decade.'

By the end of 2009, the wind energy sector employed 192,000 people in Europe. In addition, European companies employ tens of thousands of people outside of Europe. Meanwhile, the EWEA has released its forecast for wind power installations in 2010. It expects 10 gigawatt (GW) of new wind power capacity to be installed in the EU during 2010, taking total installed capacity by the end of the year to almost 85 GW – an increase of 13%.

Last year – a record year for wind power installation – saw 10.163 GW of new wind power capacity installed, constituting 39% of all new power capacity installed in the EU in 2009. Total installed wind power capacity by the end of 2009 was 74.767 GW.

Separately, the EWEA and EURELECTRIC, the association for the electricity industry in Europe, have made a joint declaration stating that a truly European approach to grid planning, together with the integration of wholesale markets, are crucial to the large-scale deployment of renewable energy. It stressed that the 10-year Network Development Plan, drawn up by European grid operators, should be linked with EU Member States' roadmaps for the development of renewable energy.

www.ewea.org

● The Worldwatch Institute has reported that about 7,300 megawatts of new solar photovoltaic power capacity was installed in 2009 – 20% more than was added in 2008.

www.vitalsigns.worldwatch.org

Glasgow in line for some off-site hospitality

An eight-storey, 198-room citizenM hotel in Glasgow, Scotland (depicted here) is being constructed off-site using the modular design method. Steel-maker Corus Living Solutions is making the buildings on a production line in North Wales. Engineering consultant Gifford, which is involved in the project, has already helped to build single-living accommodation blocks for the Ministry of Defence.

Up for the cup

Crown House Scotland FC were crowned winners of the Building Services World Cup 2010, held in Liverpool last month.

The international competition, held annually for Building Services Engineering & Built Environment professionals, is managed by Engineering Sport Ltd, with the help of Liverpool City Council, Liverpool County FA, CIBSE and other partners. The tournament is also registered with the English FA.

The event included a summer ball held at Everton FC and featured a live screening.

Plan for home design standard doubted

Plans to create minimum design standards for all new homes have come under fire from a house builders' group.

The government's building watchdog, CABE, has published a report arguing that better regulation – based on its Building For Life scheme – would provide a guarantee to consumers that new homes and neighbourhoods are designed to a high standard across the country.

CABE believes that the current set of standards 'desperately needs rationalisation' and proposes replacing this with 'a single set of clear requirements by which developments are judged and developed through the planning system, and specifically identifying those that should be delivered through the Building Regulations'.

But the Home Builders Federation doubts that the Building

for Life scheme is suitable. Head of communications Steve Turner told the *Journal*: 'The concept of a national set of planning standards is a good one, but we need to sit down and develop something that is fit for purpose and that everyone is able to work with.

'Just plucking something off the shelf will not work – and Building for Life was never created for this purpose.'

However, Richard Simmons, CABE chief executive, said: 'We all recognise that the current mix of standards is complicated, overlapping and inefficient. The industry needs a consistent set of standards – and the consumer and the community a guarantee of homes that are good enough.'

CABE points to its housing audits, which it says revealed that almost one in three homes (29%) 'were so poor that they should not have been given planning permission'.

Only one in five schemes were rated as 'good' or 'very good', revealing a disappointing picture of housing quality, and demonstrating that many consumers still get a raw deal when it comes to new homes and neighbourhoods, the organisation insists.

www.cabe.org.uk/publications/simpler-and-better

House building rises but civil engineers still suffering

Activity in the UK's construction sector has increased at its fastest rate since September 2007.

May saw the third consecutive increase in monthly activity, according to the Markit/CIPS Construction Purchasing Managers' Index (PMI) – the strongest since September 2007. It is thought a rise in new orders drove the increase in activity, and led to an increase in employment.

The National House-Building Council also reported a rise in home building across the UK, with a total of 31,038 new homes registered during February to April 2010. This represents a 74% improvement on the same period last year (17,859).

However, trading conditions for UK civil engineering contractors remain extremely tough, with workloads expected to worsen over the coming months, according to the latest quarterly *Workload Trends* survey published by the Civil Engineering Contractors Association. The survey found that the UK's larger civil engineering businesses were particularly hard hit, with 79% of firms employing more than 600 employees reporting falling workloads.

Employment was also lower for most firms than in April 2009, with 52% of companies reporting lower employment of operatives than 12 months ago, against just 9% reporting rises.

Cash support for research on future-proofing

Building design teams are being invited to compete for a total of just under £5m investment in projects that will devise ways of adapting buildings so that they can withstand climate change.

The Technology Strategy Board (TSB) will invest a total of £2.5m in the research and development project in 2010 and a further £2.4 m in 2011.

Building designers are being challenged to come up with proposals to show how they would adapt a building that they are currently working on with a construction client, so that it could cope with the future climate.

Iain Gray, chief executive of the TSB, said: 'This programme will help UK industry to tap into the market opportunity for climate adaptation services.'

The findings of the research that teams conduct will be made public by the TSB.

www.innovateuk.org or email competitions@tsb.gov.uk

International News in Brief

Atkins cools underground

Engineering group Atkins provided the low carbon cooling system in South Africa's new underground railway that opened just in time for the World Cup. Cool night-time air is drawn through the tunnels and stations before being discharged through the station entrances and ventilation shafts at ground level, reducing carbon emissions by 69%.

US Mayors vote green

The US Green Building Council has applauded the US Conference of Mayors for passing five resolutions to benefit the built environment, including financing mechanisms to pay for energy retrofits of existing buildings.

Arctic hit by 'black carbon'

A study by the US Pew Center on Global Climate Change has found that black carbon (BC) may be responsible for more than 30% of recent warming in the Arctic. BC particles strongly absorb sunlight and give soot its black color. BC is produced both naturally and by the incomplete combustion of biomass, fossil fuel and biofuels.
www.pewclimate.org

Global work experience

Students have the opportunity to take part in two-week work experience placements around the world to learn more about resources, mobility, wind, water, climate and solar, with building products manufacturer, Sika. Entrants need to answer a range of questions before being entered in a prize draw.
www.experience.sika.com

Appeal for donations

Cavendish Engineers is appealing for donations to create a working well to pump 2,500 gallons of water per minute for the people of Haiti, following the earthquake in January. A two-tank system has been devised for drinking and washing water. Donations to **lizzie.phillips@cavendishengineers.net**

Affordable housing builds could fall by two-thirds

Construction of affordable housing could slow drastically this year because of cuts and planning changes, according to the National Housing Federation.

The NHF predicts that, because of possible funding cuts and changes to the planning system, 65% fewer social homes could be built in 2010 – a total of just over 20,000.

This would represent the lowest number of affordable homes built since 1990-91 and would come as a 'devastating blow' to the 4.5m people on waiting lists, the federation warns.

The government has already announced £100m will be cut from the National Affordable Housing Programme (NAHP), which was meant to deliver 59,000 new social homes in 2010-11. The withdrawal of this funding will see plans for another 1,453 social homes axed.

About 40% of all new affordable homes are delivered through planning gain agreements, whereby private developers are given planning permission for new housing developments if they agree to build a set number of social homes on the site. But the government is thought to be considering scrapping these 'section 106' agreements to build affordable housing.

NHF chief executive David Orr said: 'Given the scale of housing need across the country, we cannot wait for the building of affordable homes to effectively grind to a halt. The Prime Minister and Deputy Prime Minister have repeatedly said that the public spending cuts will not disproportionately hit the most vulnerable, but if these measures go ahead the impact on housebuilding will be catastrophic.'

The news comes after a rapid slowdown of homebuilding following the general election. Construction information specialist Glenigan says that while Scotland and the north enjoyed a rise, the flow of projects in the south-east was 'flat at best'.

Glenigan economist Allan Wilen said: 'The construction industry will be looking to the private sector as government-funded schemes come under increasing pressure in the coming months.'

Welsh winners announced in RICS awards

The Welsh Royal Institute of Chartered Surveyors (RICS) awards have now been revealed. This year environment consultant ADAS helped its client, Llety Cynin Accommodation and Leisure, win the Design Award for Regeneration. The project saw a 150 year-old coach house in Carmarthenshire transformed into a luxury accommodation, leisure and conference complex. **www.rics.org/wales**

Transparency in real time

Two government departments have begun displaying the energy used to heat and light their ministries in real time on the internet.

The Department of Energy and Climate Change and the Home Office have fulfilled a promise made by Prime Minister David Cameron to make the government greener and more transparent.

The information is continually updated online in units of energy, cost and carbon. The move will be followed by all central government departments in coming months as part of the coalition government's commitment to cut its carbon emissions by 10% in the next year.

Energy and Climate Change Secretary Chris Huhne said: 'We're opening up Whitehall's electricity and gas meters to public scrutiny. There can be no hiding place for energy waste in central government.'

CIBSE joins with electricals group to lobby government

The Electrical Contractors' Association (ECA) and CIBSE have signed a formal 'Partners in Excellence' agreement.

The move will enable the two groups to work together to influence policymakers in government on engineering and sustainability issues.

The two bodies will also jointly look to help drive industry standards and good practice while also delivering enhanced benefits and information to members.

CIBSE president Rob Manning said: 'Buildings account for 45 per cent of carbon emissions, yet innovative services design in partnership with competent implementation can deliver dramatic improvements in energy efficiency.

'By collaborating this is just one area where CIBSE and the ECA can share best practice. Being able to access the expertise of the electrical contracting community will also be of particularly great value to our members.'and ECA chief executive David Pollock.
www.eca.co.uk www.cibse.org

Call for agency to verify product makers' claims

A supplier is calling for the creation of an independent 'enforcement agency' to verify claims about the energy efficiency of products.

Sabien Technology, which produces controls for heating and ventilation systems, said that an independent body could help businesses choose more reliable products and meet their carbon targets.

The move follows a recent *Which?* report claiming that 10 out of the 14 'clean-tech firms' investigated had exaggerated the potential savings offered by solar water heaters.

Two of the companies said that they could cut energy bills in half, when the real saving was nearer to 10%.

Alan O' Brien, chief executive of Sabien, warned: '[Businesses] are quite literally "fatigued" by propositions from companies who are promising more than they can actually deliver.

'We need an independent enforcement agency to audit and verify suppliers' claims and differentiate between low-carbon and cowboy-carbon products.'

Richard Groves, who worked on technology trials with restaurant chain Pizza Hut, told the *Journal* he agreed that an independently funded and open-to-public scrutiny body needs to be set up to prove the merits of different technologies.

He said: 'Many organisations can't afford or don't have the know-how to try extensive trials. However, factory or laboratory testing is not sufficient, and real-life testing, with extensive sub-metering, is a must to prove that a technology does what it says on the tin.'

Bill Bordass, of William Bordass Associates, said: 'The idea of yet another agency frightens me. Why isn't the Carbon Trust doing things like this? Evaluation would need to be rigorous. Often getting systems to work properly can save as much, or more, than adding gizmos.'

Breathing new life into energy saving

A new three-storey building for children at Southampton General Hospital is now complete. Energy-saving initiatives at the site include lighting control, inverter drives on fans and pumps combined with two-port valve control and heat recovery on the ventilation plant. Henderson Green engineered the building services for the £8m East Wing Annex project. When all phases are complete, services will include outpatients and radiology, an emergency department and paediatric assessment unit.

News from institutions

UHMA joins BEAMA

UHMA, the trade association for surface heating and cooling, is to become part of BEAMA, the trade body representing manufacturers in the electro-technical industry. The move brings the UK's only trade association speaking for the underfloor heating industry under the umbrella of a professional representative body.

RICS house price survey

House prices edged up in May despite the boost in houses on the market caused by the abolition of HIPs (home information packs), according to the RICS May UK Housing Market survey. Rises in new instructions moved from 11% in April to 21% in May. The actual increase in supply is anticipated to be around 15%. **www.rics.org**

Civils rate capital's infrastructure

The Institute of Civil Engineers has published a report on the state of London's infrastructure. The report looked at the state of the capital's waste, water, energy and transport and rated it overall as 'C', meaning that infrastructure across all sectors requires attention. To read the full report visit **www.ice.org.uk**

Illuminating debate

The Lighting Industry Federation has held its 'EuroLEDS 2010' seminar. Presentation topics included LEDs in Emergency Lighting and LEDs and Legislation, and involved speakers such as David Wright and Bernard Pratley. The presentation slides are available to view at **www.lif.co.uk**

RIBA reveals research awards shortlist

The shortlist for the President's Awards for Research 2010 have been announced by the Royal Institute of British Architects. The awards reward and encourage outstanding research in architecture. Eleven pieces were selected for the final stage of judging in three categories. **www.architecture.com**

UK lags behind Asia on energy efficiency

Energy efficiency is becoming more important when refitting old buildings – but the UK is lagging behind Asian countries.

That is the conclusion of the annual Energy Efficiency Indicator, an international survey of 2,800 executives and managers, carried out by the sustainable building products supplier Johnson Controls.

Globally, 71% of respondents said they are paying more attention to energy efficiency than they did a year ago. In the UK the figure was 68%, whereas it was 87% in India and 90% in China.

However, the UK fared well against other western countries. In the USA and Canada the figure was 52%, and in Europe as a whole it was 62%. Respondents expect energy prices to climb by 9% during 2010 – the main reason behind companies' quest for efficiency gains.

However, the availability of capital is the greatest barrier to capturing the potential energy savings. Some 29% of those surveyed indicated that their capital budgets are insufficient to fund all projects meeting their return on investment criteria.

The 2010 Energy Efficiency Indicator (EEI) survey covered 2,882 respondents in 36 countries, with organisations ranging from small businesses to global corporations across a variety of industry sectors. Respondents included chief executives (30%), vice presidents and general managers (36%), and facility managers (22%). **www.johnsoncontrols.com/publish/us/en/news.html**

Firms' top 10 reasons for saving energy:

1. Energy cost savings;
2. Greenhouse gas reduction;
3. Enhanced public image;
4. Government/utility incentives;
5. Attracting and retaining customers;
6. Existing legislation;
7. Anticipated regulation;
8. Attracting and retaining employees;
9. Investor reporting demands; and
10. Attracting tenants

New heights for low-carbon technology

The world's first water-and-solar powered wheelchair lift was launched at the London Festival of Architecture. Wheelchair users tried out the prototype on the steps of the Duke of York Monument in central London. Water weights are used to counterbalance the lift cart, powered by solar panels, and it has been designed with all the mechanical innards on show. The lift was created by Matthew Lloyd Architects in collaboration with the Royal Engineers, Architecture Inside Out and RIBA London. It is hoped the lift will be fully developed in time for the 2012 London Olympics.

Report lifts the lid on elevators in emergencies

A new ISO technical report reveals that lifts may be a viable escape route in buildings during emergencies.

Project leader Derek Smith believes its findings may save the lives of those with restricted mobility during a crisis.

He said: 'Over the past few years there has been considerable debate regarding the risks and hazards associated with using lifts during evacuations.

'As buildings get taller and larger, determining the extent of these risks and what can be done to minimize them is even more pressing. And in some special cases, depending on the building's size and design, lifts may also significantly reduce general evacuation time.'

The main objective of the report, ISO/TR 25743:2010, *Lifts (elevators) – Study of the use of lifts for evacuation during an emergency*, is to provide building designers with a decision-making process to determine whether a given design can enable the safe use of lifts in the event of an emergency for a particular building. The report can be applied to lifts and buildings of any size, whether new or existing. **www.iso.org**

Shutterstock

Zero carbon targets are unrealistic, says industry

The majority of those working in the UK property and construction sectors do not believe that the government's zero carbon targets are realistic, a survey has found.

About 7,000 people were questioned in the survey, produced for the British Property Federation, international law firm Taylor Wessing, and specialist research and communications consultancy Spada.

While the respondents were convinced that the 'stick' of regulation is most likely to drive progress in future, more than three-quarters (76%) felt that plans for making all new housing zero carbon by 2016 were unrealistic.

Almost as many (73%) believed that plans to make new commercial property zero carbon by 2019 were also not realistic.

These targets, formulated previously under Labour, have been adopted by the new coalition government. Liz Peace, chief executive of the British Property Federation, said: 'An inconsistent approach to regulation and its implementation, or the setting of targets that are perceived as unachievable, is likely to impact negatively on the delivery of the sustainability agenda by the industry.'

The report found that 68% cited sustainability as either 'very' or 'highly' important. While 70% said they had a sustainability strategy in place, success was frequently not measured.

Helen Garthwaite, UK head of construction and engineering at law firm Taylor Wessing, said: 'Alongside regulation, better measures to define success and value will be essential. It is possible that some voluntary benchmarks could in effect become mandatory through industry promotion and use.' **www.taylorwessing.com/hittingthegreenwall**

Atkins weathers storm

Global design and engineering group Atkins has reported an increase in group profits of 9.6% in its results for the year ended 31 March 2010.

The improvement took its operating profit to £113m. However, Atkins has reduced its staff in total by about 13%, bringing the number of its employees down to 15,601. But of those, about 600 people were already under notice at the start of the year, giving an in-year reduction of 1,816 staff from around 17,400 – a decrease of 10%.

Although chief executive Keith Clarke believes that the future of the industry remains quite turbulent, with significant cuts ahead, he was keen to stress that there are still opportunities for the engineering sector.

He said: 'There's going to be cuts in every sector and there are going to be delays in every sector, but there's a massive opportunity with all that. The real efficiencies for capital programmes come from better engineering.'

He described the next five years as a fundamental time for engineers to help transform the UK into a low carbon economy.

www.atkinsglobal.com

GOLD LowProfile
- even for restricted spaces

GOLD LP (low profile) is a completely new member of GOLD air handling units generation D.

It is extremely thin in relation to its excellent performance and its outstanding energy efficiency. It can be installed in crammed spaces and without having to occupy valuable floor space. Typical installation possibilities are horizontal installation inside a suspended ceiling or vertical installation inside a closet. The unit has space-saving sliding doors which simplify service and maintenance.

As all the other members in the GOLD series, GOLD LP is equipped with direct-driven supply air and extract air fans, supply air and extract air filters, heat exchangers and built-in control equipment.

Swegon Ltd
Phone: 01992 450400
Fax: 01992 450500
info@swegon.co.uk
www.swegon.com

CIBSE news

Tel: 020 8675 5211 Fax: 020 8675 5449 **Email:** secretary@cibse.org
President: Rob Manning BSc (Hons) ENg FCIBSE **Chief executive and secretary:** Stephen Matthews

Help youngsters to get inspired

CIBSE is offering built environment professionals the opportunity to help entice youngsters into the building services industry.

As reported in March, CIBSE signed a Memorandum of Understanding with the Sector Skills Council, SummitSkills. The agreement commits the institutions to working together to promote and develop the Building Services Engineering (BSE) Ambassadors scheme – part of the STEM (Science, Technology, Engineering and Maths) Ambassadors programme, which has more than 20,000 volunteers across the UK.

Three months on, the scheme has received enthusiastic support. Oliver King, a senior consultant at AECOM working in the Sustainable Development Group, explains his role to young audiences as 'helping organisations become greener and save money'.

STEM Ambassadors are all volunteers who act as inspiring role models to young people. They are able to bring something different to the classroom with activities that can open the door to a whole new world for young people, helping them to see STEM subjects and careers with a fresh perspective and engage their interest and imagination in new ways. Each Ambassador is registered, trained and CRB-checked.

Richard Cannon

Oliver King shines a light on building services engineering

The STEM Ambassadors programme endeavors to make a real difference to the delivery of STEM subjects to young people, working to make every school in the country aware of the programme through a network of 27,000 STEM Ambassadors by 2011.

CIBSE is encouraging members who already have links with particular schools or colleges to join the scheme, as well as seeking new recruits.

As a STEM Ambassador you will have the opportunity to:

- Gain a fresh perspective on day-to-day work;
- Face a different challenge to that of everyday work;
- Enjoy a sense of achievement;
- Help make a difference in the local community;
- Challenge stereotypes about STEM subjects and other related careers; and
- Strengthen your own abilities, including communication, planning and presentation skills.

It is also an opportunity to have lots of fun!

For more details contact **aringguth@cibse.org or fred.titterington@summitskills.org.uk**

YEN Champions

The shortlist for this year's YEN Champions Awards 2010 – recognising innovation in developing engineers of the future – has now been announced.

The awards, sponsored by Baxi Commercial Division, seek to reward those organisations which proactively champion young people in the industry.

The shortlist is:

Small company category:
Anderson Green Ltd, IMA Cooling Systems

Medium company category:
CBG Consultants Ltd, Imtech Aqua Ltd

Large company category:
Arup, Parsons Brinckerhoff (Asia) Limited

This year's awards were judged by: Andrew Saville, Armville Consultancy (panel chairman); Keith Clarke, Atkins; Rob Manning, AECOM and CIBSE president; Paul Hardy, Baxi Commercial Division; Morwenna Wilson, Arup and YEN chairman; and Michael Norton, Atkins and immediate past YEN chairman.

The winners will be announced at an awards ceremony on 8 July, with each receiving a trophy and £1,000 of CIBSE training vouchers. An additional trophy for the overall winner will also be presented.

Managing overheating in buildings: new guidance

Recent hot summers have led to uncomfortably warm conditions for some building occupants – and, with temperatures rising, there are increasing concerns about workplace conditions.

New guidance from CIBSE offers a practical introduction to the subject of overheating for building owners, managers and users. Part of the Knowledge Series, *How to manage overheating in buildings* has been prepared by a CIBSE Overheating Task Force and the Health and Safety Executive. It covers:

- What is meant by overheating in buildings and how this relates to occupant comfort;
- How overheating could be monitored/assessed;
- Factors that contribute to overheating within buildings; and
- Practical measures to minimise the risk of overheating.

How to manage overheating in buildings is available now, priced at £21 for members and £42 for non-members (order code KS16). The CIBSE Knowledge Series offers accessible introductions and practical guidance on a wide range of topics. Another recent title includes *Capturing solar energy* (KS15). To find out more visit **www.cibse.org/bookshop**

News in brief

Graduate entries sought

The closing date for this year's CIBSE/ASHRAE Graduate of the Year award, sponsored by Baxi Commercial Division, is fast approaching. Entries need to be received by 30 July. Judging will take place on 7 October. The award, which recognises the achievements and potential of young engineers who have graduated in the last two years, offers the winner a trip to the ASHRAE winter conference in Las Vegas. **www.cibseashrae.org**

Undergraduate Award 2010

This is your last chance to enter the CIBSE Undergraduate Award 2010. Sponsored by Hays Building Services, the award offers newly graduated students from BSc, BEng, MEng or MSc programmes industry recognition, as well as encouraging academic excellence. The first prize is £500, with a runner-up prize of £100. To enter, simply send a 2,000-word synopsis of your final year project, together with the completed application form, by 31 July 2010. **www.cibseyoungmembers.co.uk/news/awards**

Win a trip to New York

This year's Society of Public Health Engineers 'Young Engineers Award', gives teams the chance to win a trip to New York and Niagara Falls. This year's theme is 'Innovation in Public Health Engineering'. Teams of up to three, aged 18 to 30, should submit an A3 paper demonstrating their proposed innovation. The deadline is 23 July. **www.cibse.org/sophe**

Training and development

The closing dates for annual submissions to be considered at the September 2010 Training and Development Panel meeting is 7 September. Training submissions and any queries, plus employers' enquiries and applications for approved company training schemes, should be sent to Parvin Begum, training and development administrator, on 020 8772 3612 or email **pbegum@cibse.org**

New government heralds 'change of direction'

With a new government we can expect some new policy directions – HIPs (home information packs) have already been replaced. But some policies will continue, with minor variations. New Housing Minister Grant Shapps took little time to confirm his support for 'zero carbon homes', and promised to sort out the definition, something which industry representatives, including CIBSE and the Zero Carbon Hub, have already been working towards since the start of the year. Visit **www.communities.gov.uk** and go to news releases for more details.

Meanwhile, the consultation on updating the planning policy supplement on adaptation to climate change has closed. CIBSE has responded (see the Knowledge Bank at **www.cibse.org**), although since the election, it is far from clear how the planning policy will now be delivered. Further consultation may be inevitable. CIBSE's response noted the potential for the policy's planning elements to conflict with Building Regulations – a concern CIBSE has raised directly with the Building Regulations team within the Department for Communities and Local Government. And readers with a manufacturing interest may wish to see the (closed) consultation on the introduction of '*Civil sanctions and cost sharing for the Energy Using Products and Energy Labelling Regulations*'. This covers the proposed enforcement regime for requirements introduced under the Energy Using Products Directive. Full proposals are available at **www.defra.gov.uk**

Graham Manly stands down

Graham Manly stood down as honorary treasurer of CIBSE at the AGM on 6 May, after four years in the role. Manly has a long record of service to the industry, being a past president of CIBSE, the current president of the HVCA, a board member of SummitSkills, and a former chairman of BSRIA. CIBSE has benefited greatly from his work in modernising the governance of the institution, and from the careful eye he kept on the finances. We are grateful to Manly for his outstanding contribution, and look forward to his continued input in other capacities.

Collaboration is key to delivering

Incoming president Rob Manning urged members to 'just do' the real engineering needed to deliver low energy buildings – regardless of inter-governmental debate.

In his presidential address, 'Collaborate and Deliver', Manning stated: 'The time has come to really prove that we are taking carbon dioxide reduction and energy efficiency in buildings seriously. As engineers in society, regardless of the outcome of inter-governmental discussions, such as those in Copenhagen, we need to "just do it". Just do the real engineering required by our national governments. The only way we can meet the demands of comfort, environmental and safety aims, cost and time is to have the right people with the right interests in the project teams from the start.'

He emphasised that team work is essential, enabled by collaborative contracts and appointments. He also talked of collaborating to improve education and training opportunities to attract the engineers of the future. He concluded that CIBSE can only achieve these aims by working with all parties involved, from trade organisations to vendors.

His full address is available at **www.cibse.org**

Annual

CIBSE has held its annual general meeting (AGM). An official record of the meeting is below

CIBSE's AGM was held at the Royal Aeronautical Society, Hamilton Place, London W1 on 6 May 2010. Mike Simpson, outgoing president, chaired the meeting. Chief executive Stephen Matthews read the notice convening the meeting.

The minutes of the 32nd AGM, held on 7 May 2009 and published in the August 2009 issue of the *CIBSE Journal*, were accepted as a correct record and signed by the chairman.

Annual report and financial statements

Mike Simpson introduced the annual report and financial statements, referring to the very positive year-end membership level of 19,827. He also referred to the Young Engineers Network, which had grown substantially to 700 members. The Society of Light and Lighting celebrated its centenary during the year, with many technical and social events. The Hong Kong region celebrated its 30th anniversary, and the Benevolent Fund its 75th anniversary. Reference was made to awards, including the Low Carbon awards at the Annual Dinner, the Graduate of the Year award, and the Graduate Scheme award, made to employers for their support of graduates in the industry. The new *CIBSE Journal* was also noted, which was operating successfully, and reference was made to the institution's publishing activities, with nine new technical publications issued during the year. The range of government consultations to which CIBSE had contributed was noted, and reference made to the Royal Academy of Engineering report, 'Engineering a low carbon built environment', which highlighted key challenges and opportunities for CIBSE.

Sally-Jayne Bonner, of Chantrey Vellacott, the institution's auditors, read the audit statement

general meeting

confirming the responsibilities of the auditors and the trustees, and stating that the accounts presented a true and fair view of the institution's finances, with no qualification to the audit statement.

Graham Manly, honorary treasurer, presented an overview of the financial position for 2009, drawing attention to the main areas of the institution's activities. Last year (2009) had been a difficult year for the industry, and the institution was not immune with total income down by more than £800,000. While membership numbers had held up, the number of members transferring to the retired roll had increased, which affected income. The institution's trading subsidiary, CIBSE Services Ltd, experienced a substantial decrease in income, but a slight cost increase as a result of investment in new activities, including the new CIBSE Journal, and further software investment in certification activities. More accurate allocation of overhead costs to CIBSE Services had also increased its costs, with areas of cost within CIBSE being reduced. Costs relating to membership had increased, reflecting the transfer of subscription processing and income chasing to the membership department.

Overall, the result for the year had been an operating deficit of £185,000, although improved investment values resulted in net incoming funds of £339,000. Graham Manly gave credit to the executive team for keeping close to the original budget despite the very difficult conditions. The significance of CIBSE Service Ltd activities was stressed, and a breakdown of the various income streams to CIBSE Services was presented. In particular, certification income was a very significant factor, but the ongoing difficulties in this market were noted. CIBSE events and Mid-Career College had also performed well in the conditions. The new *CIBSE Journal* was also in surplus, despite the difficulties of launching a new publication under difficult market circumstances.

In response to questions, it was explained that restricted funds could only be used for that purpose for which they were given. It was noted that CIBSE Hong Kong had significant income and costs compared with other regions, and was now run through a subsidiary limited company; the notes to the accounts set out its income and expenditure before consolidation.

Graham Manly proposed the adoption of the accounts, this was seconded by Alan Sherratt and approved nem con.

Auditors

Graham Manly confirmed that the audit had been undertaken smoothly, and thanked the accounts team and auditors.

Graham Manly proposed that Chantrey Vellacott be appointed as the institution's auditors for 2010, and that the board be empowered to agree their remuneration. This was seconded by David Wood and approved nem con.

Special resolution

Graham Manly moved the special resolution for subscriptions for 2010 as set out in the calling notice. While the institution's finances were sound, there were pressures on funds, and the board had taken the view that it would not be appropriate to hold subscriptions unchanged. A small increase of around 1.5% had therefore been proposed, which it was hoped would avoid the need for larger rises in future years. Rob Manning seconded the motion.

A suggestion was made that payment might be taken in two instalments to ease fees for members. It was confirmed that various options had been considered by the finance sub-committee and the board, and it was agreed that the issue would be reviewed again, while avoiding systems that would incur higher administrative costs.

Regarding the budgetary situation going forward, it was noted that it was difficult to predict this for 2011, and the amount of the increase proposed would be quite small. However, it was felt that it was a difficult time to propose any more significant increase, which might prompt some members to reconsider whether to review. The proposal was approved nem con.

Officers for 2010:

Stephen Matthews declared the following individuals elected to serve as officers, board members and council members following the AGM 2010:

Officers:
President: Rob Manning
President-Elect: Andy Ford
Immediate Past President: Mike Simpson
Vice Presidents: Terry Dix, David Fisk, Peter Kinsella
Hon Treasurer: Nick Mead*
**following a ballot for the Office of Honorary Treasurer*

Members of the Board:
Elected Members: George Adams, Paul Hardy

Members of Council:
Elected Members: Chris Northey, Geoff Smyth

Extraordinary general meeting

An extraordinary general meeting of CIBSE was held at the Royal Aeronautical Society, Hamilton Place, London W1 on 6 May 2010. Mike Simpson, president, chaired the meeting. Chief executive Stephen Matthews read the notice convening the meeting.

Special resolutions – Royal Charter and by-laws

Graham Manly introduced the resolution, explaining the background to the proposals to amend the Royal Charter and by-laws of the institution, and to introduce new regulations. The proposals were intended to update terminology and practices, permit greater flexibility for minor changes, and to change the membership requirements for the licentiate grade in line with previous changes to other qualifying grades. Reference had been made to Engineering Council guidelines, which would enable the institution to make changes to matters of detail without the need for Privy Council approval. The proposals would slightly reduce the number of Royal Charter clauses, and greatly reduce the number of by-laws, with much detail being transferred to new regulations. Changes to some issues would still need the approval of the membership in general meeting.

The proposal to separate the licentiate grade of membership from Engineering Council registration, in line with changes already made to the fellow, member and associate member grade, was explained, as was the proposal to include licentiates among the corporate members of the institution to allow members of the grade full voting rights.

In response to questions, it was noted that the regulations document used the masculine in all cases, which might be considered inappropriate. Advice was taken that this was still the norm for legal documents, and it was agreed that this would be added in a preface to the document.

It was clarified that the bulk of the regulations would be subject to change by the board, but that changes to election arrangements for the board, board procedures, powers and duties, the amount of annual subscriptions and notices would require the approval of a general meeting. Regarding Engineering Council requirements for registration, it was confirmed that these were separated from the institution's grade requirements, but that the same competence requirements had been retained.

It was noted that council was now a consultative body, but its existence and the requirement for it to be consulted were included in the by-laws and regulations.

Special resolutions one – Royal Charter amendments

Graham Manly moved the adoption of special resolution one, which was seconded by Bryan Franklin and approved nem con.

Special resolutions two – by-law amendments

Graham Manly moved the adoption of special resolution one, which was seconded by Terry Giles and approved nem con.

New members

FELLOW

Bradley, Nicholas Roy	Ripon
Chao, Yu Hang Christopher	Hong Kong
O'Byrne, James Christopher	Hampton
Westmore, Peter Jeremy	Edinburgh
Yuen, Conn Hong Nei	Hong Kong

MEMBER

Abel, Stephen R Frank	Northampton
Ah King, Andrew Christopher	Mauritius
Allen, Kevin	Reading
Alzubaidi, Safaa	United Arab Emirates
Andrews, Graham	Brighton
Ayoub, Mohammed	Huddersfield
Bates, Ross Edward	London
Benstead, Timothy	Hull

FELLOW

Chao, Christopher Hong Kong

Christopher Chao
A professor and acting head of the department of mechanical engineering at the Hong Kong University of Science and Technology, Christopher Chao started his university teaching career in 1995 and has achieved significant research accomplishment in the fields of 'energy efficient built environment', indoor air quality and public health.

Bentley, Thomas William David	London
Bosman, Willem	London
Bourne, James	Colchester
Cameron, James David	Tranent
Cepok, Wojciech Franciszek	London
Chahrour, Samer	London
Chen, Ying	London
Clarke, Daniel Peter	Alderley Edge
Cooper, Jamie Edward	Bury St. Edmunds
Corbella, Stefano	Italy
Dafaalla, Moawia	United Arab Emirates
Dargan, Brian Joseph	London
Davison, Mark John	Newcastle upon Tyne
Dedman, Ben James	Hove
Dengusiak, Michal	Germany
Dixon, Bertie	London
Doughty, Mark Ian	Royston
Drennan, Gillian	Belfast
Edmondson, John	St.Albans
Edwards, Neil Thomas	Reading
Elliott, Jessica Anne	London
Elsworth, Julian	London
Entwistle, Russell	Leeds
French, Simon James	Ivybridge
Gandhum, Baldev Singh	Slough
Gardner, Richard William	Australia
Garton, David	London
Gifford, Mark	Glasgow
Gillies, Andrew	Milton Keynes
Graham, Andrew John	New York, USA
Graham, Scott Thomas	Newcastle upon Tyne
Grant, David James	Maidstone
Hale, Peter	Croxley Green
Hammond, Jonathan	Birmingham
Hariprasad, Mankad	Manama, Bahrain
Harrington, Adam	Hertford
Hartley, Susan Nina	London
Hawkins, Lee	Faversham
Hayes, Kevin William	Brentwood
Herdman, Christopher	Musselburgh
Hixson, Andrew William	London
Howard, Nicholas Stephen	North Yorkshire
Hubbard, Henry	London
Hui, Ka Man	Shatin, Hong Kong
Iredale, Simon James	Barnsley
James, Simon	Middlesex
Jayasundera, Wijayasiri Jonjkku Hewa	Romford
Ji, Ying Chun	Leicester
Jones, Lyndon Hywel	Exeter
Keegan, Tracy	Glasgow
Keighery, Mark	South Shields
Khan, Muhammad Ijaz	Smethwick
Kwok, Wai Ying	Hong Kong
Lake, Robert James	Teddington
Law, Yee-Man Allison	Hong Kong
Lewis, Kyron Anthony	Bedford
Li, Ho Yim	Hong Kong
Lo, Yiu Cheong Joseph	Hong Kong
Loffman, Matthew Steven	Birmingham
Lord, Donald Anthony	Newcastle Upon Tyne
Lui, Wai Man	Hong Kong
Ma, Chun Man	Hong Kong
MacGregor, Alexander Ross	Glasgow
Marsh, Andrew Paul	London
Mawjee, Nazir	London
Maxwell, Alan	Glasgow
May, Geoffrey	Broadway
McFadzean, Craig James	Blairgowrie

FELLOW

O'Byrne, James Hampton

James O'Byrne
James is the regional director for the hurleypalmerflatt West End office. He has more than 25-years' experience in the industry and has a particular interest in integrated energy and engineering solutions for large commercial and mixed-use developments.

FELLOW

Bradley, Nick Ripon

Nick Bradley
Nick Bradley is managing director of engineering consultancy, BryErny Building Physics Ltd, and a CIBSE Low Carbon Energy Assessor and Low Carbon Consultant with more than 25-years' experience in building services design and specialist thermal modelling analysis. He has unwavering enthusiasm to find sustainable solutions that are efficient and innovative to meet client and compliance requirements.

McGivern, Sean Michael	Belfast
McQue, Kevin David	Stockport
Michalak, Lukasz	London
Michelena, Cristiano	London
Monnox, David	Bristol
Moody, Lindsay Bailey	Salford
Moraza, Jon	London
Najdrowski, Daniel	Glasgow
New, John Anthony	Banstead
Ng, Pak Ling	Hong Kong
Ntalios, Thomas	Veroia, Greece
O'Donovan, Brian Daniel	London
O'Neil, Kelvin	Peterborough
O'Shea, Brendan	Republic of Ireland
Ou, Chun-Hung	People's Republic of China
Parsley, Julian Mark	Santa Monica, USA
Pearce, Richard	Solihull
Pheely, Thomas George	Stirling
Piper, Andrew	Enfield
Puttick, Chris James	Bristol
Ravenhall, Paul Mansfield	Stourbridge
Rice, Eamonn Michael	Ballynahinch
Robinson, David Wyndham	Hampshire
Roper, Richard Thomas	Bakewell
Russell, Andrew	Farnborough
Smith, Andrew David	Redditch
Sneyd, Andy	Wilmslow
Steele, John David	London
Stewart, Martin Alexander	Dalkeith
Suen, Fu Hing, Derek	Hong Kong
Tang, Chi-Wing	Hong Kong
Tauckoor, Giovanising	London
Tayler, Scott	London
Taylor, John Paul	Sheffield
Thomas, Lee James	Cardiff
Thomas, Nelson	Bahrain
Tse, Peter	Egham
Urquhart-Proctor, Stewart	Bromley
Wade, Amy Louise	Bath
Ward, Kevin	Glasgow
Wikner, Austen Forbes	Potters bar
Williams, Jake Guy	Glasgow
Wilson, Matthew	London
Wong, Wun Man Susanna	Hong Kong
Woon, Henry Shui Cheong	London

ASSOCIATE

Adams, Kenneth Stephen	Rossendale
Bannister, Richard	Birmingham
Carmody, Philip	Republic of Ireland
Cheeseman, Michael Eric	Reading
Cox, Christopher Andrew	Bristol
Dixon, John	Bracknell
Emile, John Nathan	Romford
Harris, Andy	Surrey
Hassan, Sherif	Greenford
Hayes, David Jonathan	West Sussex
Hopton, Tom	Radstock
Kelly, Campbell Dale	Hamilton
Leahy, Christopher	Republic of Ireland
Lukojko, Marek	Glasgow
Lunt, Stewart Anthony	Liverpool
MacIntyre-Cathles, Paul Martyn	Tadworth
Manston, Stephen	Guildford
McLauchlan, David James	Culver City, USA
Molyneux, Robert	Castleford
Newins, Lee Andrew	Kingsbridge
Noon, Gavin Brett	Loughborough
Norris, Robert	Bristol
Palmer, Kavon	Bristol
Purser, Lydia	Westcliff-On-Sea
Salmon, Jerome	London
Shale, Samuel G	Banstead
Thomas, Shaun Abraham Kannothra	Esher
Todd, Simon Edward	Newcastle upon Tyne
Williams, Brian Anthony	Tenterden

FELLOW

Yuen, Dr Conn Hong Kong

Dr Conn Yuen
Educated in the UK, Dr Conn Yuen started her career as a thermofluids specialist. After working on many high-profile projects, she relocated to Hong Kong in 2005, where two years ago she started her own sustainability consultancy, CO2nnsulting. She has worked on Rolls Royce and Alstom Power gas turbines and is currently working on Asia-based sustainability projects in the built environment.

Coalition clips scheme's wings

A programme aimed at encouraging the take-up of micro-renewables has become a casualty of the spending squeeze. **Carina Bailey** reports on a mixed response from the construction industry

Illustration: Russ Tudor

The sudden closure of the Low Carbon Buildings Programme (LCBP) to new applications, without official confirmation that the Renewable Heat Incentive (RHI) will fill the void next year, has left the sector in limbo, some in the industry fear.

The LCBP grants scheme for micro-generation equipment was officially closed without notice on 24 May by the Department of Energy and Climate Change (DECC). Britain's deficit was cited as the reason behind the move, but, overall, it will save just £3m of the £6bn of savings that the new coalition government is striving for in this financial year.

The Solar Trade Association (STA) branded the closure a 'retrograde step' in light of the government's ambition to reach 12% of renewable heating by 2020.

Howard Johns, chairman of the STA, said: 'It's a very disappointing move from the new coalition, which is aiming to be the greenest government ever. Solar thermal offers the UK a unique opportunity for jobs, growth and energy security, and yet we have once again been undermined for short-term gain.

'At this point we have no idea what the RHI will look like and whether we will get it at all – effectively leaving our sector in limbo, and jobs at risk.'

The STA is calling on the government to plug the funding hole left by the LCBP until the RHI is confirmed and introduced.

During the years it was open, the LCBP provided about 20,000 grants for the capital and installation costs of micro-generation equipment, of which, to date, around 11,000 have been for thermal technology.

DECC claims these have produced savings of 300,000 tonnes of CO_2. But, despite these benefits, it argues that there is no longer a need for the LCBP, following the introduction of feed-in tariffs (FiTs) for electrical micro-generation on 1 April this year. Its closure will contribute to the £85m of planned savings DECC announced in May (prior to last month's Emergency Budget).

In a statement, DECC said: 'It was anticipated that support for the proposed Renewable Heat Incentive for heat under LCBP would continue up until its proposed introduction in April 2011.

'However, demand for grants has been unprecedented and we had very little unallocated funding remaining. It has been decided that by closing the programme now, these unallocated funds will contribute to DECC's overall savings.'

In contrast to the STA, the trade association for surface heating and cooling, UHMA, anticipates that the warm-water underfloor heating market could benefit from the closure of the LCBP, arguing the programme was fundamentally flawed to begin with.

Chris Ingram, UHMA's chairman, said: 'The LCBP put the sole emphasis for efficiency on the generation of heat, completely ignoring the vital roles of controls and the heat emitter.

'If it wants to make real progress towards the carbon reduction targets, the coalition government must promote a holistic approach to the way we heat our buildings, rather than investing huge sums of money

in just one part of the system.'

Ingram is now calling for a complete reassessment of the roles of heat sources and heat emitters.

However, the Heat Pump Association (HPA) has written to Energy and Climate Change Secretary Chris Huhne, expressing its disappointment at the closure of the LCBP. It describes the programme as providing an early stimulus to industries in the process of establishing credible alternatives to fossil fuel heating systems.

Dimplex, a manufacturer of energy efficient heating products, also describes the LCBP as key to developing the UK's fledgling renewables industry. It says the programme helped to create demand for sustainable technologies such as heat pumps. Now it fears the sudden cancellation will lead to 'market paralysis and ultimately to job losses in a sector which is widely viewed to be instrumental in reaching the UK's demanding carbon emission reduction targets'.

> **"The LCBP provided upfront costs whereas feed-in tariffs only provide an income once the capital has been invested"** – Sam Archer, AECOM

Sam Archer, associate director at multi-disciplinary consultancy AECOM, questioned where the funding will now come from to buy and install micro-generation equipment. 'The LCBP provided upfront capital costs whereas FiTs only provide an income once the capital has been invested,' he said.

'Commercial projects are almost never interested in lifecycle costs, and public projects only pay lip service to them, so it has to be questioned where the capital will come from to fund schemes.'

There is also mounting concern about the RHI not yet being officially confirmed, he added: 'It is now very unclear how heat technologies will be incentivised once the LCBP is withdrawn. No guarantee has been given either that the RHI will be retrospective (for projects funded this year) even if it is introduced.'

But John Alker, director of policy and communications at the UK Green Building Council, believes that industry shouldn't get the move out of perspective, although he admits that manufacturers have a short-term issue in terms of demand until the RHI kicks in – something he thinks will go ahead.

'No one is suggesting this is the end of the renewable industry,' he said. 'This is just going to provide some short-term challenges. And it's the FiTS and the RHI that are the key policies for providing that impetus to demand and level of certainty as these emerging industries gather in their FiTs over the next couple of years.'

A spokeswoman for DECC confirmed to the *Journal* that the RHI will still go ahead, but the detail of the policy is now in question following the change in government. A consultation on the issue closed earlier this year under the Labour administration.

She said: 'We know we have got a target for renewable energy, we know we have got to have some renewable heat. The ministers are considering now about what that incentive might look like.'

The *Journal* asked DECC whether this could lead to another consultation in the future, and the spokeswoman said it couldn't be ruled out.

DECC added that the LCBP had not been 'singled out' for cost savings, and it was closed to new applications immediately to prevent a run on remaining funds. It said applications worth £63m due for payment in 2010-11 are not affected by the cuts, and where grant offer letters have been issued they will be processed to provide 'continuity and continuing market development'. ●

www.lowcarbonbuildings.org.uk

Roll-call of schemes From LCBP to FiTs to RHIs

Low Carbon Buildings Programme (LCBP):

A grant scheme that encouraged the uptake of low carbon buildings technology in the UK, and developing the assembly, supplier and installer base, especially for electrical micro-generation.

It was closed to new applications as part of the coalition government's first round of cuts on May 24, and because of the introduction of FiTs. During its operation it:

- provided about 20,000 grants
- produced lifetime carbon savings of 300,000 tonnes of CO_2.

Feed-in Tariffs (FiTs)

Provide cashback in return for the generation of clean energy. The scheme guarantees a minimum payment for all electricity generated by the system. It covers the following electricity-generating technologies, up to an installation size of 5MW:

- Solar electricity (PV) (roof mounted or stand alone)
- Wind turbine (building mounted or free standing)
- Hydroelectricity
- Anaerobic digestion
- Micro combined heat and power (mCHP) (limited to a pilot at this stage) greater than your monthly loan repayment (with a 25 year loan).

The scheme operates three benefits:

- **Generation tariff** – a set rate paid by the energy supplier for each unit (or kWh) of electricity you generate;
- **Export tariff** – you will receive a further 3p/kWh from your energy supplier for each unit you export back to the electricity grid; and
- **Energy bill savings** – you will be making savings on your electricity bills.

Renewable Heat Incentive (RHI)

The idea for a renewable heat incentive was introduced under the previous Labour administration as a way of making renewable heat more affordable for people. It should also help government to reach up to 12% of the UK's heat demand from renewable sources by 2020. A consultation ended in April, but the new coalition government hasn't ruled out the possibility of holding another one.

Sources: Communities and Local Government/Energy and Climate Change departments; Energy Saving Trust

Letters

Reasons to be cheerful amid the economic gloom

Reading the May issue of the *Journal*, I feel real empathy with the predicament of building services engineers fearful for their jobs in a recession ('Pay hits the doldrums', page 46). But do these articles show that we have really progressed industry's thinking of 'boom and bust' cycles and the effects on skills retention?

As a 1989 BS engineering Bath University graduate, the early 1990s were a sombre time to enter the profession. I was fortunate with my employer; but by 1994, with industry figures advocating in the trade press that BS engineers 'take a study year out', I followed their advice. And, with my eyes opened to other possibilities, I did not return to the profession.

However, I retain a fascination with the current engineering possibilities in built-form design that, in 1989, felt remote. 'The grass is not greener' in other industries, nor are they immune from the effects of recession. Of course salary is important, but is it not equally important to give BS engineers good clear reasons to stay?

The next decade should bring real changes, with energy distribution and micro-generation technologies becoming mainstream, more clients seeing real economic benefits of good built-form design, and a growing recognition by government of its role in supporting these positive changes – and BSEs are key to making these happen. What better future messages could an industry have to appeal to its profession and public? So perhaps now is the time to start to identify and articulate clearly these messages, and to give BSEs real reasons for cheer. Then, perhaps through the next economic cycle, progress in better skills retention will become demonstrable.

Richard Graham
Head of strategic development, Balfour Beatty Rail

Where is CIBSE's response?

Doug King's article ('Tailor-made efficiency', April *Journal*, page 42), and the Royal Academy of Engineering report it is based on, call upon the government, education, and the professional institutions to bring about some radical changes to help realise a low carbon economy.

Specifically, CIBSE is asked to 'embrace all aspects of low carbon building design – not just energy efficient design of mechanical and electrical systems'. In light of the publicity generated by the RAE report, and having published this call for action in the magazine, I was disappointed that CIBSE did not take the opportunity to respond in the *Journal*.

In the first instance I would like the CIBSE view of the issues raised in the RAE report - does CIBSE think these are pressing issues?

In the longer term, I would like to know what the vision of the institution is to meet these challenges and what outcomes we will see as a result.

David Clark
Max Fordham Consulting Engineers

Can hands-off designers really specify M&E?

Do you think that a person who has never driven a car could design one? If you have never cooked could you create a recipe? Then why does CIBSE accept that a designer can design and specify the mechanical and electrical (M&E) services in a building without ever experiencing their operations?

If we want great M&E designers we have to plug away at making the point that our young people need real experience on site during construction, and during operation.

The current interest in operational engineers is long overdue. It has been held back by the now 60-year-old M&E people who were lucky enough to get the 'full Monty' when they were 20 and assumed that everyone since knows what they know. If designers cannot get direct experience, then the next best thing is that get input from quality operational engineers during design.

So many of the features designed into new buildings make them expensive to own, prone to failure, and no good to house a business. The maintenance market cannot cope with these designs. Sometimes they cannot cope because, to stay in business, they have to be the cheapest bid – which also means that they are reactive, not proactive.

So I ask that designers look at what happens to their buildings after occupation and contemplate whether they would want to be introduced to the occupants as the creators of their misery!

John Rose MCIBSE

Put controls in users' hands

Building management systems (BMS) are so stuck in the past. It's about time the industry utilised the vast computing capacity we now have, to enable ordinary people to 'drive' buildings – only then will we be able to make them work efficiently. Controls are at the centre of most problems I come across in existing buildings; they're not set up for the user. I find it takes a long time to get into the BMS, and then to explore how much or little data it gives me. Shame on makers of controls, and shame on those who write the specs!

Anon

CIBSE Journal welcomes article proposals from any reader, wherever you are – whether it be letters, longer opinion pieces, news stories, people or events listings, humorous items, or any ideas for possible articles.

Please send all letters and any other items for possible publication to: bcervi@cibsejournal.com, or write to Bob Cervi, Editor, *CIBSE Journal*, Cambridge Publishers Ltd, 275 Newmarket Road, Cambridge, CB5 8JE, UK. We reserve the right to edit all letters. Please indicate how you wish your letter to be attributed, and whether you wish to have your contact details included.

Opinion

Let's do 'em up

First we scrapped cars, then boilers. **John Deasy** asks whether it's now time for commercial buildings to be the next scrappage scheme target

First there was the scrappage allowance scheme for cars, which targeted vehicles more than 10 years old and gave car owners a £2,000 allowance towards a new vehicle. Then there was the boiler scrappage scheme, providing a £400 voucher to replace a G-rated boiler with a new A-rated one or energy efficient alternative. So why not apply the same principles to fund energy efficiency improvements for commercial buildings?

No, it's not a proposal to knock down all of our current stock! But surely it would make more sense to combine all the energy efficiency schemes and policies currently available into a unified arrangement, giving occupiers and building owners a single scheme that allows them to upgrade their facilities from G-rated to A-rated?

The car scrappage scheme was designed, in theory at least, to boost the car industry – keeping factories running and people employed – while improving the efficiency of vehicles on the road. It was extended until March 2010, and is generally now viewed as a success.

In December 2009, the government announced a domestic boiler scrappage scheme aimed at removing G-rated domestic boilers and replacing them with new, highly efficient A-rated condensing boilers or renewable energy systems.

The scheme provided an allowance of £400 towards the supply and fit of a new boiler and was expected to benefit some 125,000 homeowners. However, bearing in mind we have some 26 million homes in the UK, this represents just 0.48% of the current stock, so the scheme merely scratched the surface of the problem.

What's more, it's likely that these new boilers are being fitted into uninsulated, draughty houses, thus partly defeating the object. According to the Confederation of British Industry, homeowners and businesses waste £15m worth of energy every day due to a combination of inefficient boilers, and poorly insulated walls, roofs, windows and doors.

So, how could a building scrappage scheme work? Using the existing energy performance certificate (EPC) scheme might be one way, giving building owners and occupiers the opportunity to claim the various allowances in a simple arrangement via council tax rebates. As it is via council tax, we have the added advantage of local control and accountability – something the new government is very keen on. Similar in operation to the Home Energy Management scheme, it would have a number of advantages:

- Creating jobs in manufacturing and installation;
- Saving at least some proportion of the estimated £15m per day lost to the economy that literally goes out of the window (or through the wall, roof or up the flue);
- Improving the infrastructure of the country for the long term and enhancing its asset value; and
- Saving thousands of tonnes of CO_2 emissions – and surely that's the point.

Implementation of the scheme could take a similar form to the way car tax is decided: the more emissions a building is responsible for, the higher the business rates or council tax. Any money accrued from this scheme could be provided in grants and loans to improve the efficiency of low scoring stock.

> **Providing incentives now for building refurbishment will help to revive our ailing building industry**

The grounds for this may already have been laid, as the current government consultation, *Making Better Use of Energy Performance Certificates and Data*, proposes to give local authorities access to anonymised EPC data so they can target poorly performing homes with energy efficiency advice. A similar arrangement for commercial buildings would be welcome.

It might be a radical suggestion, but why not? When needed, the government propped up the banks with some £850bn* of loans and guarantees – none of which will go towards improving the infrastructure of this country. This puts the meagre £50m offered for boiler upgrades into context.

Money spent now on improving the infrastructure will provide carbon reduction benefits for years to come. Surely we can do much more to provide incentives for building refurbishment – which will help to revive both our ageing building stock and ailing building industry. ●

John Deasy is UK commercial director of multi-disciplinary engineering consultancy, Hilson Moran.

REFERENCES:
*www.independent.co.uk/news/uk/politics/163850bn-official-cost-of-the-bank-bailout-1833830.html

HIP replacement

As home information packs are scrapped in England and Wales, Brussels agrees new revisions to a key European directive on building efficiency. **Hywel Davies** pieces the changes together

Britain's coalition government kept its promise to end Labour's home information packs (HIPs), which were required for the sale of dwellings. Duties relating to HIPs set out in Part 5 of the Housing Act for England and Wales were suspended on 21 May 'pending their outright abolition at the earliest opportunity'. As a result, in England and Wales, sellers and estate agents no longer have to hold or provide copies of HIPs.

But the energy performance certificates (EPCs) that formed part of HIPs have been retained. EPCs are, of course, a requirement of the 2002 Energy Performance of Buildings Directive (EPBD). Moreover, ministers will now also have to take on board changes recently agreed in Europe to 'recast' the EPBD. The changes were adopted by the European Council of Ministers and Parliament in May and published on 18 June.

> **The UK will now have to take on board changes recently agreed in Europe to 'recast' the EPB Directive**

One implication of the changes is that an EPC will have to be commissioned before a dwelling is marketed: Article 12 of the recast requires that when a home 'is offered for sale or for rent, the energy performance indicator of the energy performance certificate... is stated in the advertisements in commercial media'. This requirement in effect limits marketing activity before the EPC is available. It remains to be seen how the coalition government intends to addresses this change – but it does not need to do so until 9 January 2013, when Article 12 is implemented!

The recast EPBD, in Article 27, also requires EU member states to introduce 'penalties [for] infringements of the national provisions'. Such penalties must be 'effective, proportionate and dissuasive'. CIBSE and its partners in the Non-compliance Costs Campaign, are seeking an early view from government on its plans to introduce such penalties, and pressing for this to happen well before the 2013 deadline.

Given the lack of enforcement of energy certificates at present, the revised air conditioning inspection requirements in the EPBD revisions are also interesting. In the original EPBD, the UK secured an alternative to a requirement for compulsory boiler inspections: this involved an option to 'take measures to ensure the provision of advice to users concerning the replacement of boilers, other modifications to the heating system and alternative solutions to assess the efficiency and appropriate size of the boiler.' The proviso was that 'the overall impact of this approach shall be equivalent to that arising from the [inspection] provisions'.

The recast EPBD offers this approach for air conditioning inspections. We wait to see how this might be applied, especially with ministers' emphasis on 'reducing burdensome red tape'. There is evidence to demonstrate the cost savings delivered by thorough air conditioning inspections. Far from being burdensome red tape, properly conducted air conditioning inspections save on public spending, cut energy use and reduce carbon emissions.

The recast may also affect the way refurbishment is covered in the Building Regulations. Article 7 requires refurbished buildings to meet the energy performance standards for new buildings, at least insofar as this is 'technically, functionally and economically feasible'. And Article 8 requires EU member states to set minimum energy performance requirements for heating, hot water, air conditioning and large ventilation systems to be installed in existing buildings. 'Intelligent metering systems' are also required. These requirements must be set by January 2013 for the public sector, and July 2013 for the private sector.

In Building Regulations Part L, Approved Document L2B covering refurbishment of non-domestic buildings will probably also need to incorporate these minimum requirements in 2013. This could be a significant evolution in standards for building refurbishment. ●

For the text of the EPBD recast, visit http://eur-lex.europa.eu and select 'Access to European Law'

Hywel Davies is technical director of CIBSE.

non compliance costs

CAMPAIGN CHARTER

1. The UK government must acknowledge that air conditioning inspection compliance is not working and must move the responsibility for enforcement away from trading standards to a body that is more interested and able to act.
2. The government must set targets for air conditioning and F-gas compliance that the enforcing body agrees are achievable and will sign up to.
3. The government must improve communication with UK companies informing them of their obligations to comply with air conditioning inspection and F-gas legislation.

www.cibse.org/noncompliancecosts

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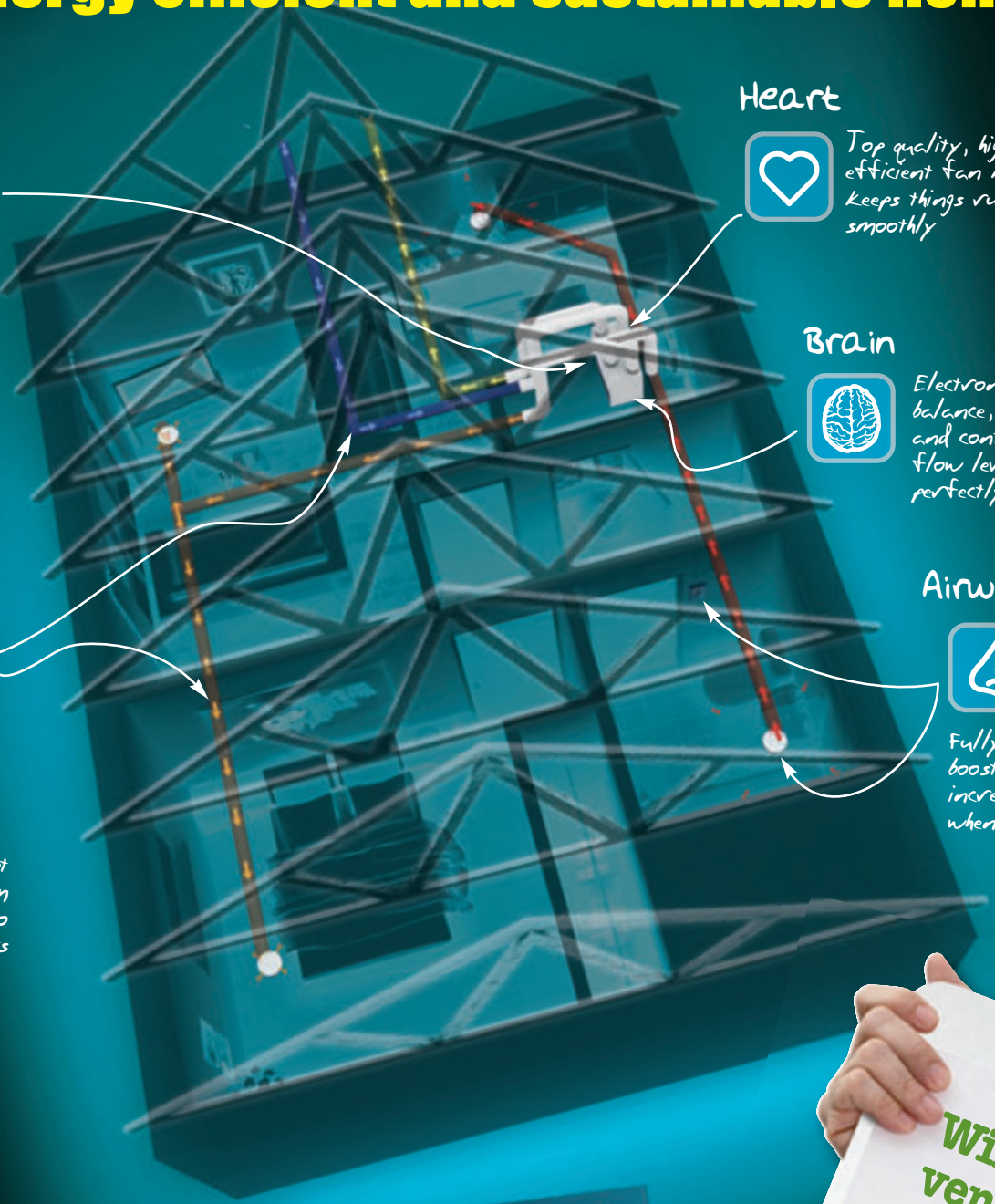

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'Outstanding' challenge

Professional services group PricewaterhouseCoopers wanted its planned new London headquarters to set the highest sustainability standards for offices – which meant the project team having to raise the bar half way through the building's development. **Andy Pearson** reports

There is a new landmark on the south bank of the Thames in east London. Alongside Tower Bridge is 7 More London which, despite its conventional, glazed corporate appearance, is significant in being the first building in the capital – and the first major speculative office in the UK – to have been awarded a BREEAM Outstanding rating. Moreover, when the designers started work on this building back in 2006, the rating did not exist.

The fact that the designers have succeeded in creating what has potential to be one of the greenest office buildings in the capital is partly attributable to the determination of its future tenant, the global business consultancy PricewaterhouseCoopers. PwC wanted its planned headquarters to set a new standard in office design. The result is very much down to the close collaboration between developer, More London, the environmental engineer for the building's shell and core design, Roger Preston and Partners, and the tenant's fit-out design team led by architectural and engineering consultancy, BDP.

The result of all this collaborative effort is currently nearing completion. 7 More London is the final and largest building to be constructed under the masterplan for the More London site. The 10-storey, 60,000 sq m building incorporates 48,000 sq m of office space located above retail units set at ground and lower ground level.

Construction of the building's shell is complete – its glazed, symmetrical wings of offices open out to embrace the river revealing a hollow circular drum, housing the reception, at its core. Three curved bridges connect these two wings at levels two, five and eight, while at the rear the building's southern elevation drops to seven storeys to respect the existing buildings along Tooley Street. Inside work is under way to fit out the offices ready for occupation in early 2011.

The project was conceived in 2006 as having the potential to meet the PwC's vision for the design of sustainable office buildings, says Bob Spittle, chairman of environmental engineering at BDP. At the time of its selection, the building's shell and core design was at outline design stage (RIBA C), with a planning requirement to achieve a minimum environmental rating for speculative office development of BREEAM Very Good (2006). But PwC pushed the developer and its design team, along with BDP, to target the highest level of environmental performance attainable at that time, BREEAM Excellent (2006).

'We had the opportunity with the design process for the building to take a blank sheet of paper and raise the bar, both for ourselves and others, in the sustainability performance of buildings,' says Roger Reeves, a partner at PwC.

> "We had the opportunity with the design process for the building to take a blank sheet of paper and raise the bar"
> – Roger Reeves

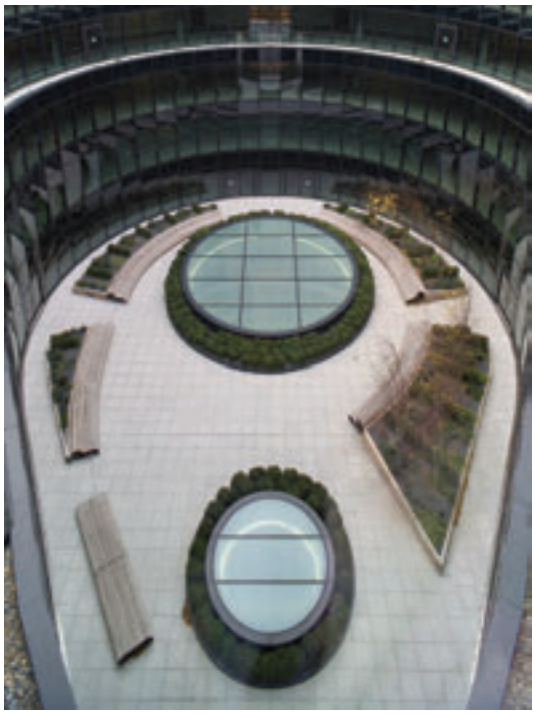
Accordingly both Roger Preston and Partners and BDP set about designing to achieve BREEAM Excellent. As the building's engineering design progressed, however, details began to emerge of an upgrade to BREEAM and the impending release of BREEAM Offices 2008. This was a blow to the design teams because the upcoming revision not only proposed to significantly increase the criteria needed to achieve the Excellent rating, it also proposed the introduction of mandatory credits for criteria such as the provision of storage space for recyclable waste, along with changes to the weighting for certain design criteria.

The revision even proposed the introduction of additional design credits for innovation to encourage a new approach to environmental design. But the biggest change of all was the proposal to add the elite rating of Outstanding to the BREEAM classification system, which meant their building would no longer count as one of the very best.

What made matters even worse for the design teams >

7 More London, due for occupation next year, is a 60,000 sq m mixed-use building that is part of a new development on the south bank of the Thames in London

All images: David Barbour/BDP



Project team

SHELL AND CORE

Client: More London Developments

Architect: Foster & Partners

M&E consultant: Roger Preston & Partners

Structural engineer: Arup

Construction manager: Mace

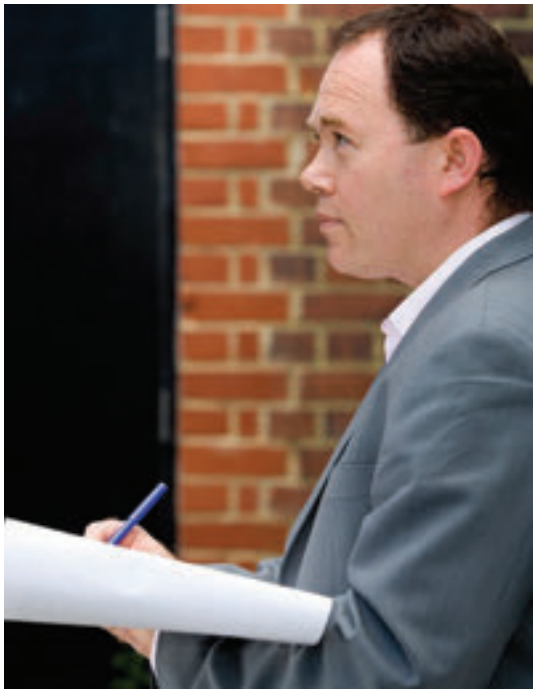
TENANT FIT-OUT

Client: PricewaterhouseCoopers

M&E and interior design: BDP

Project and cost management: Turner & Townsend

Fit-out contractor: Overbury



Stephen Runicles, right, says the key to achieving BREEAM Outstanding was 'starting with a good base building'

> was that, under the more challenging criteria of the revised BREEAM, their low-energy design would only have scraped into the third best category: BREEAM Very Good. As it stood, this building would not be raising any bars. PwC upped the ante and set a target for the building to achieve BREEAM Outstanding (2008). To achieve this rating the design would have to achieve a minimum of 85 out of a possible 100 environmental points. This was uncharted territory.

To stand a chance of getting close to the threshold of 85 points, collaboration between the developer's and tenant's design teams was essential to grasp every opportunity to tease every last credit out of the scheme. 'You've got to be determined to set and achieve these new standards – involve people early on and make sure the support of your developer, contractors and design team matches the vision of your clients,' says Spittle.

BDP undertook a detailed study to assess the impact of BREEAM 2008 on both shell and core design and fit-out in order to identify further opportunities to achieve environmental performance improvement. Fortnightly workshops were established to address key decisions and to optimise the integration between the shell and core and the fit-out designs.

'The key to attaining the Outstanding rating was to start with a good base building;' says Stephen Runicles, environmental design director at BDP. Fortunately Roger Preston and Partners' design for the base building already included many low energy and environmentally beneficial features. These combined a high-performance building envelope based on an argon-filled, low-transmission glazing system fitted with extensive shading to minimise solar heat gains.

'Their design also included a biofuel-based tri-generation system to produce heat, power and cooling using absorption chillers (CCHP). The system incorporated two engines each capable of developing 385kW of electricity along with 400kW of heating and 416kW of cooling. Also included in Roger Preston's design was a solar thermal hot water supply to the core's toilet pods and a heat recovery ventilation system.

Various enhancements were also added to the original proposals. A regenerative braking system was incorporated into the building's 16 lifts. The specification of the CHP engines was enhanced to enable them to run on any biofuel, including used cooking oil. Plate heat exchangers were added to CCHP units to increase the use of waste heat and extend the CCHP unit's run time so that they now provide up to 25% of the building's total electricity demand.

The environmental designers were helped in their task of securing more BREEAM points by the building's structural designers Arup, who succeeded

BREEAM Taking credit for achieving 'Outstanding'

The eight out of a possible 10 credits achieved by 7 More London were:

- Involvement of expert accredited professional BREEAM advice from pre-stage C (= two credits)
- Meeting over 50% of the building's energy demand using low and zero carbon technologies
- The building becomes a learning resource by displaying environmental performance data to staff and visitors
- 80% recycled aggregate used in the concrete
- Exemplar performance under the considerate contractors' scheme
- Recovering heat from the chillers that would normally be rejected to atmosphere, and using this heat in the perimeter heating system
- Water sub-metering

in using 80% recycled aggregate in the building's concrete structure for the first time – an achievement that merited the award of the first-ever BREEAM point for Innovation.

On the office floors, the enhancements included the replacement of the office fan coil units with active chilled beams. The amount of fresh air supplied to these units is minimised by linking it to CO_2 concentration in the offices.

"Make sure the support of your developer, contractors and design team matches the vision of your clients" – Bob Spittle

In another brave move, the building's electric perimeter heating was replaced by a low-grade hot water heating system fed from heat recovery units added to the building's roof-mounted chillers. The units supply low-grade hot water at 45 deg C, but the addition of the heat recovery system also improved the chillers' efficiency by 35% and earned the design team another BREEAM point for Innovation.

In addition, a sophisticated control system was also developed with extensive sub-metering to monitor cooling, heating, power and lighting loads on a zone-by-zone basis.

The offices are also fitted with an ultra-efficient, high-frequency, fully-programmable low-energy lighting system, which is daylight-linked. The system uses internet protocol, which enables it to be controlled by the building's occupants via their PCs within strict boundary conditions and will incorporate time-clock control and presence detection for out-of-hours working. In hospitality areas, restaurant, cafes and corridors, BDP has opted for high-efficiency LED bulbs to help reduce maintenance and save energy.

The building has even been future-proofed to allow further environmental enhancements when these become cost effective. This includes strengthening the building's structure in key areas to enable the tenant to install rainwater storage tanks in the future. There is also provision for the future installation of a solar electric array on the building's roof – should it become cost effective for PwC to do so.

Having achieved BREEAM Outstanding for the design, the next challenge for the designers is to work with the contractors to ensure the construction waste targets are met and the scheme achieves an Outstanding rating under the BREEAM post-construction review. 'We're not being complacent; we're working hard with the contractors to ensure that they meet these very challenging targets,' says Runicles.

The good news for the design team was that the building succeeded in achieving a BREEAM Outstanding rating based on its design. It was also awarded an energy performance certificate A rating. According to Runicles, the building will achieve 'a 70% improvement in CO_2 emissions over current (2006) Approved Documents L2A'. The good news for the tenant is the integration of the developer and tenant teams, meaning the estimated cost increase of taking the building from BREEAM Excellent to BREEAM Outstanding was limited to £2.50 per sq ft. ●

Fact file 7 More London's high-performance features

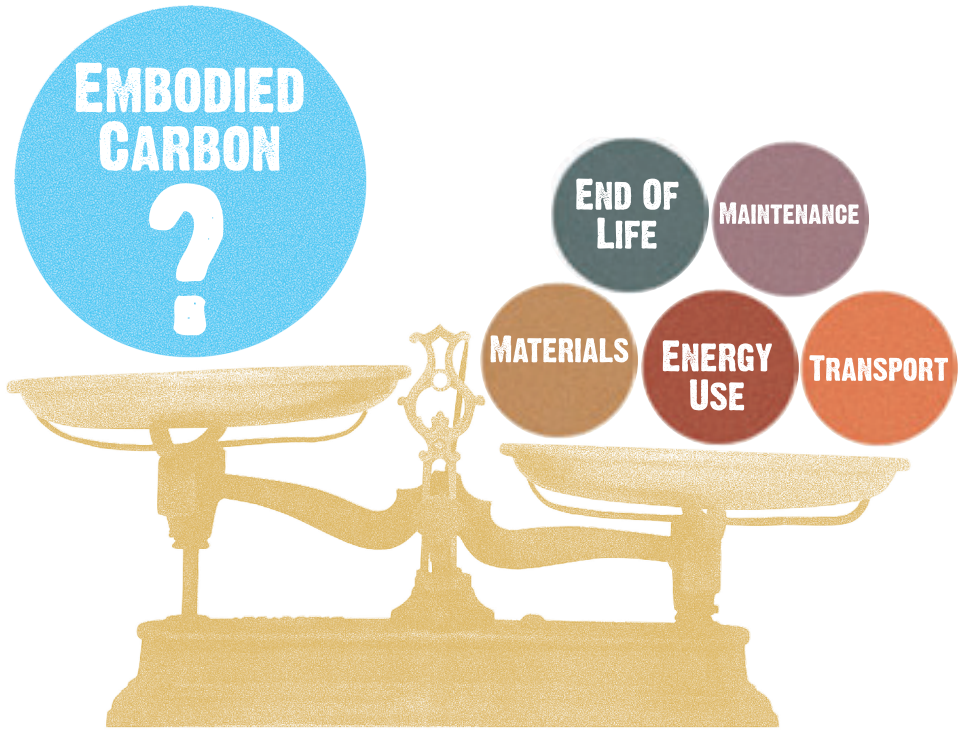
- Argon-filled, low-transmission glazing building envelope, based on an argon-filled, low transmission glazing system, fitted with extensive shading to minimise solar heat gains
- Specification of the CHP engines enhanced to enable them to run on any biofuel, including used cooking oil
- Biofuel-based tri-generation system to produce heat, power and cooling using absorption chillers (CCHP)
- Plate heat exchangers added to CCHP units to increase the use of waste heat and extend the CCHP unit's run time to provide up to 25% of the building's total electricity demand
- Solar thermal hot water supply to the core's toilet pods and a heat recovery ventilation system
- Replacement of the office fan coil units with active chilled beams
- Low-grade hot water heating system, fed from heat recovery units, added to the building's roof-mounted chillers
- Sub-metering to monitor cooling, heating, power and lighting loads on a zone-by-zone basis

- High-frequency, fully-programmable low-energy lighting system, which is daylight-linked. Fitting of LED bulbs
- 80% recycled aggregate used in the building's concrete structure
- Regenerative braking system incorporated into the building's 16 lifts

"The key to attaining the Outstanding rating was to start with a good base building" – Stephen Runicles

Weighing it all up

Embodied carbon is fast being recognised by the industry. Here, **Carina Bailey** investigates what 'embodied' means – and how one property developer is measuring it. On the following pages, in our cover feature, we look at design issues for making buildings last longer



Embodied carbon is the next nemesis facing the construction industry – no ifs, buts or maybes. That's the firm view of Guy Battle, a partner at consultancy dcarbon8, part of the Deloitte group. He insists that now is the time to stop shying away from the topic, because embodied carbon can be responsible for as much as 50% of a building's lifetime emissions, which are locked into a project from the very beginning.

Embodied carbon is becoming increasingly important when considering the overall 'lifecycle carbon footprint' of a building, which encompasses both embodied and operational carbon, according to Battle. Using this lifecycle approach should enable engineers in the future to factor in the carbon – or energy consumed – in producing the raw materials, plus their extraction, transportation to site, manufacture, assembly, installation, disassembly, deconstruction and/or decomposition – the 'cradle to grave' carbon definition.

The problem, argues Battle, is that until now the focus has largely been on reducing operational energy once a building is occupied.

One of the major barriers to including embodied carbon in designs is that, at present, there is no universally applied modelling tool to convert embodied-energy data to produce a carbon footprint. Moreover, the answer will be different depending on which database you use, Battle insists.

Despite drawbacks, Battle says, we must focus on embodied carbon and not just on the operational carbon footprint: 'It's no longer a matter of agreeing that embodied carbon is an issue. The carbon is embodied now – next year, last year, this year – it's in the building construction process. So does it really matter how much carbon you're emitting operationally in 60 years' time? The damage has already been done.'

Battle addressed a recent UK Green Building Council seminar on embodied carbon. Another speaker there, Peter Mayer, research and development manager of BLP Insurance, says the highest-impact components, such as concrete and steel, account for anything up to 60% of the building's embodied carbon – and it is here where you can make real savings. But the problem, he says, lies in measuring it. There is plenty of guidance available, but this provides only frameworks.

Both Mayer and Alice Moncaster, a researcher at Cambridge University's Centre for Sustainable Development, agree that what the industry needs is to 'have a measure for embodied carbon, dealing with the complexity and variety of data that gets some sort of best value out of a building, trading off a number of issues over a lifecycle – a lifecycle-cost energy and carbon modelling tool,' – something that Mayer says BLP is already working to create.

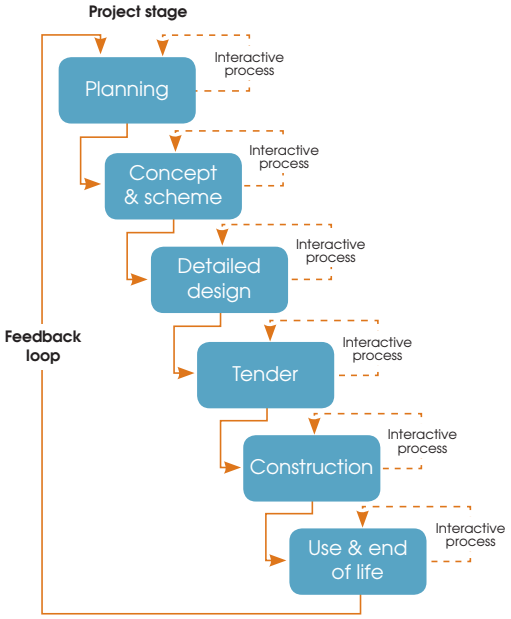
However, this will be no easy task, says Moncaster, due to the sheer range of data that embodied carbon can incorporate. In fact, European data shows embodied energy in housing can account for anything between >

> "Does it matter how much carbon you're emitting operationally in 60 years' time? The damage has already been done"
> – Guy Battle

Embedding low carbon design?

A dedicated carbon manager helps to integrates low carbon into the design of a building by becoming involved at every stage of the process – working alongside the architects, designers, structural engineers, and building services engineers. Their role is to interact with the design team, giving advice on low energy buildings and low embodied carbon buildings. Throughout the process they will try to identify reductions.

Source: Guy Battle, partner, dcarbon8 (Deloitte)



500 and 7,500 kWh per sq m. Moncaster insists: 'I think that, in order to reduce emissions from housing, we need to be able to measure all the emissions, and not ignore those due to the embodied energy just because they're complicated.'

Apart from the fact that industry is only now beginning to grapple with the concept, another rather concerning point is the 'massive lack of awareness' in the supply chain. Battle says: 'They've [manufacturers] generally got no idea – they run away like headless chickens when you put it in a specification.'

He also criticises manufacturers for charging a cost premium of 10, 15 or 20% for low carbon products: 'In theory, when you have a lower carbon material it should use less energy; by definition it should cost less.'

But he describes it as 'fundamental' that embodied carbon be included within Building Regulations, and says planning authorities should adopt embodied carbon as a measure, putting less emphasis on

Ropemaker Place Calculating an office's lifecycle carbon footprint

British Land's commercial city office building, Ropemaker Place, London, has had its 'lifecycle carbon footprint' calculated. The developer asked carbon and sustainability consultancy dcarbon8 to measure and calculate the amount of embodied and operational carbon that will be used throughout the Ropemaker's lifecycle – expected to be 60 years.

A leading engineering consultancy carried out two calculations of energy use for the building: the first using SBEM, and the second using a more complex dynamic model based on different assumptions of occupancy and 'small' power.

Ropemaker's energy use was found to be as much as 53% higher than that calculated in SBEM for the purposes of Part L compliance (see chart, top right).

Dcarbon8 used its own in-house tool to calculate the embodied carbon. This took into consideration the carbon impact of all the lifecycle stages, primarily: the carbon generated by extracting the raw materials; the transportation of those materials to site; the on-site activities during construction; the maintenance of the building, such as replacing the cladding; and how the materials used in the building are disposed of at the end of its life through dismantling.

This information gave the 20-storey, 595,000 sq ft office block, over a 60-year lifespan, a total carbon footprint of 197,000 tCO_2e – equivalent to 98 years' worth of the building's energy consumption. The split between embodied and operational

Land Securities

carbon is 42:58. But, according to Guy Battle, partner at dcarbon8, if the grid is decarbonised from 0.5 $kgCO_2e/kWh$ in 2010 to 0.1 $kgCO_2e/kWh$ in 2030 and 0.2 $kgCO_2e/kWh$ in 2050 (as cited by the Committee on Climate Change in 2008), the split between embodied and operational carbon changes to 68:32.

Sarah Cary, sustainable developments executive at British Land, says the research has led to a number of lessons learned about the way it builds and maintains property. For example, the research has enabled British Land to calculate its total development carbon footprint for 2008 and 2009 – see chart, bottom right – using the results from Ropemaker Place as a baseline.

This analysis has also shown that some 50% of its total carbon footprint is controlled by its own activities and decisions as a developer and owner, with the other 50% the result of the activities and decisions of its occupiers.

It also revealed that extraction, fabrication and erection of steel and concrete comprised an estimated 16% of the total carbon footprint at Ropemaker, making them priority materials for British Land to focus on in future developments. Maintenance and refurbishment was also found to account for 15% of the total footprint over a 60-year lifespan, indicating that British Land should also focus on refurbishment specifications in the future.

The research also suggests that, if the national electricity grid decarbonises, as planned by government, Ropemaker Place's total carbon footprint would decrease by 39%, resulting in the proportion related to materials and site construction activities (embodied impacts) increasing from 42% to 68%, meaning the developer's choice of building materials in the future will be even more important.

Cary concludes: 'We need to pay attention to what we're doing now with our fit-outs and refurbishment. Embodied carbon is bigger than we thought it was. We didn't realise it was such a big factor in our impact on the environment.'

renewables and more on the planning chain. 'We need to develop policy documents and we also need to develop and agree on protocols and methodologies.'

To complicate matters further, constructing buildings that are designed to use less operational energy tends to lead to more embodied carbon being used compared to conventional buildings, Battle argues.

Embodied carbon is an issue that property developer British Land has taken on board, developing its own approach to assessing the carbon footprint of its portfolio of buildings. Sarah Cary, sustainable developments executive at British Land, has found that the materials used account for a large chunk of embodied carbon in a construction project.

Questioning whether Part L of the Building Regulations goes far enough, she asks: 'Do we need to go beyond the Part L approach? I don't think the calculation methodologies are there yet. I don't think the transparency about the data is there yet.'

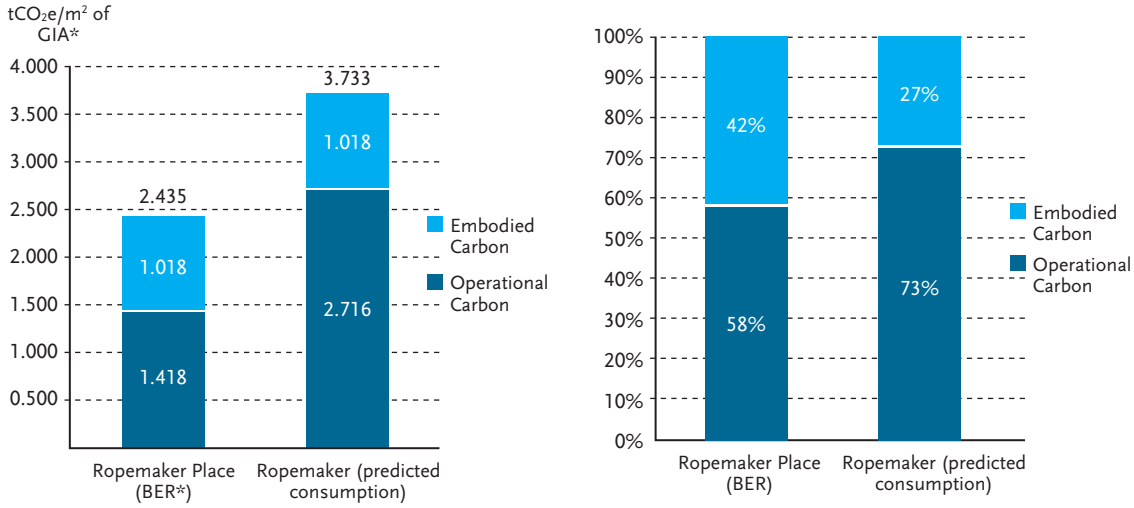
Cary also believes that, as a company, British Land now needs to think more about whether it needs to completely redevelop a building because of the 'hidden' embodied carbon created in constructing new ones.

She adds: 'It's got to be a partnership approach, we've got to look at both operational as well as embodied to understand how they work together in many cases.'

However, it is not just embodied carbon that industry needs to consider; water, too, is set to become a serious source of concern for industry, according to Battle: 'While we're all worried about carbon, the next thing is whether water is going to be as important. We're now beginning to do embodied water analysis on buildings. We've just finished a project for M&S and there was a 50/50 split between the embodied and operational water footprint: 'The issue about water is that, when we emit carbon, it's the world's problem, and when we take water from the ground there's a very local scarcity issue and it can affect businesses.' ●

"I don't think the calculation methodologies in Part L are there yet; nor is transparency about the data"
– Sarah Cary

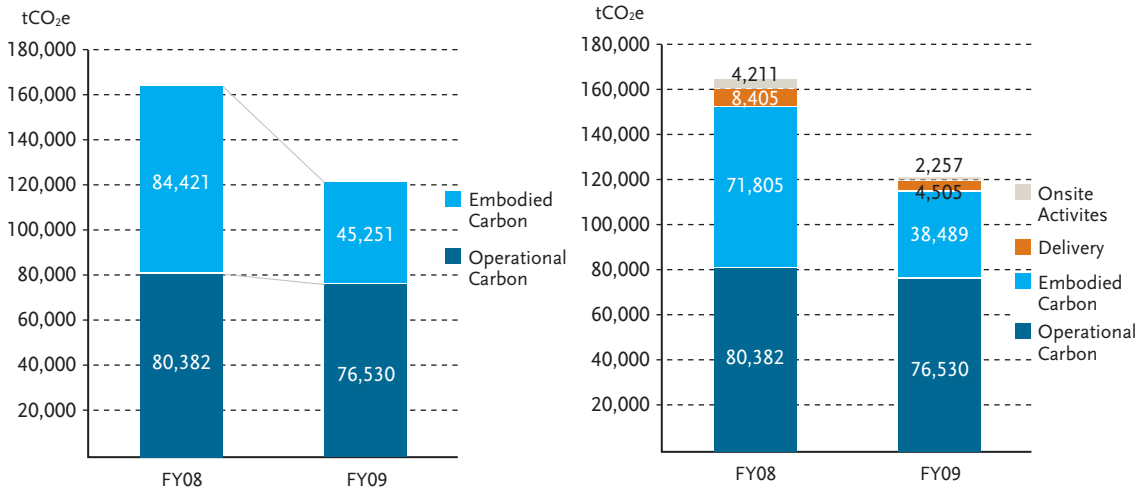
Ropemaker Place: BER* calculation vs predicted total carbon emissions



*BER = building emission rate, GIA = gross internal area

British Land has calculated the carbon footprint of commercial property Ropemaker Place in London. The two left-hand bars show, first, the calculated BER and, second, Deloitte's predicted emissions. The two right-hand bars show these figures by breakdown between embodied and operational carbon

British Land: carbon footprint of entire portfolio



British Land has assessed the embodied and operational carbon footprint of its portfolio for 2008 and 2009 (see panel on facing page)

Unenduring

Industry can genuinely improve sustainability by taking embodied carbon into account and extending the lifespan of our buildings, writes **David Telford**

Climate change is the most serious global sustainability issue and the energy required to operate buildings a major component of global emissions. As a consequence, considerable efforts have gone into reducing buildings' operational energy by improving the energy efficiency of the building envelope. However, this approach only partly meets the challenge of making our buildings more sustainable.

The latter half of the last century saw the economic life of non-domestic buildings fall considerably. Poorly constructed commercial blocks of the 1960s and 1970s are increasingly being pulled down because they are seen as no longer fit for purpose – and have, in effect, exceeded their economic life.

Apart from recovering steel frames and a little of the concrete as low-grade aggregates, the materials that went into them are lost or only available in a very degraded form. If we compare this situation with the best of Victorian and Edwardian construction, we see a very different picture, with basic building structures preserved and remaining fit for purpose and reuse. In sustainability terms, the natural resources invested in their construction are still yielding a return.

However, we are still designing buildings that, in 40 years' time, will no longer be fit for purpose and will not be able to be economically refurbished. In an effort to cut costs or, simply to get projects off the ground, we are in danger of repeating past mistakes.

Renewal

A modern low-energy commercial building will have a core structure that has a useful life well in excess of 100 years. The shell may well have a useful life in excess of 50 years, while some services can be expected to last for around 30 years and the interior fit-out for 20 years.

As we move to a more carbon-constrained future, we will not be able to afford, in energy terms, to demolish buildings and degrade and lose high-embodied energy materials. Although we are seeing improved demolition

legacy?

We are still designing buildings that will not be fit for purpose in 40 years' time – with demolition rather than refurbishment likely to be the only affordable option

Chris Bacon/PA Archive/Press Association Images

practices evolve, with higher levels of material recovery, this in itself will not be sufficient.

Buildings need to be capable of being upgraded and adapted to new purposes, with building services designed so that at the end of their economic or technological life, they can be removed and dismantled to allow high levels of component and material recovery.

This is all the more important when you consider the embodied energy content of a building built in the last 30 to 40 years.

It was thought until recently that the embodied energy content was peripheral in comparison to the energy used in operating the building during its life.

> "To get the most from our embodied energy 'investment', we need to make our buildings last longer"

This differential has typically been calculated at 10% embodied carbon to 90% operational carbon. However, as building lifespans have come down, so too has the operational energy footprint.

In contrast to what we are seeing with the building envelope, the embodied energy in plant and equipment has increased as building services become more complex. The net effect is that the embodied energy as a percentage of the whole has gone up and may now be the equivalent of many years of operational energy use.

In the case of complex low-energy buildings, the embodied energy component is not far off the lifetime operational energy demand. So, to get the most from our embodied energy 'investment', we need to make our buildings last longer.

Life assessment

For critical building components we are beginning to adopt full probabilistic approaches to lifetime assessment. This method gives a calculated probability of failure and enables plant and engineering systems to be retained beyond their normal considered life expectancy; and, in doing so, provides a more sustainable solution to life-cycle plant replacement.

This lifetime model is based on a statistical assessment of sub-systems and components. While this does not necessarily give a specific failure date >

Properties that are built to last will yield long-term sustainability benefits

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> "We need to learn lessons from the Victorians to achieve better, more sustainable, longer-lasting buildings"

for any specific component in a system, it does allow the economic life to be extended. The nuclear and aerospace industries have produced a substantial body of work on probabilistic life assessment to safely extend the life nuclear plant and aircraft. These tools are now being adopted for sustainable building design.

Sustainable design is the practice of adopting the principles of sustainable development to the design process. It involves seeking low environmental impact solutions – both now and into the future. A sustainable building is therefore one that can be adapted, upgraded and continually improved to meet evolving performance requirements, by integrating some fundamental design principles.

It means, in effect, learning lessons from the Victorians in order to achieve better, more sustainable, longer-lasting buildings. ●

Dr David Telford is a director at the multi-disciplinary consultancy, engineering firm hurleypalmerflatt

Design Principles for developing longer-lasting buildings

Flexibility in design parameters: Design-in flexibility in use to cope with varying demands and to future proof. Examples include multi-fuel biomass boilers capable of being retrofitted for different calorific value fuels or distribution systems that can support a wide range of uses and occupational densities.

Modular design: To allow key components to be swapped/upgraded to adapt to meet evolving best practice. This might include a distribution system that could take a range of renewable energy options.

Design for dismantling: To recover components and materials at the highest value point. Make sure the lifetime records contain information, specifically, labelling of components to identify those that can be recycled and setting targets on recyclable content of various types of building components.

Choose appropriate design solutions recognising projected building life: Design appropriate structural elements (depending on the projected life of the building). For example, the use of concrete rather than steel structural elements for long-life buildings while using lighter weight and easier to recycle steel frames for shorter-life projects.

Design for longer life: Use probabilistic failure analysis for life extension programmes rather than using guides and specifying components that can be repaired and maintained.

Passive ventilation and high thermal masses: Make extensive use of passive techniques.

Flexible and adaptable design: Today's office could be tomorrow's hotel. The complete design should consider potential change of use during the design phase. For example, structure (column spacings), floor to ceiling heights, infrastructure, risers, plant positions/spacing.

Design for recycling: Specify materials/components that can be economically recycled. For example, raised access flooring that is 100% steel rather than containing composites.

Large venues like the National Theatre on London's South Bank are more able to improve the efficiency of their lighting. The Theatre Trust is aiming to help smaller theatres take action too

Low energy without the drama

London's theatres are major users of energy, but many smaller venues struggle to make improvements. A lighting designer-turned-efficiency adviser tells **Jill Entwistle** that he hopes to change all that

It's hard to imagine a theatre without thinking of lighting. From the flashy façade and the showy chandeliers, to the bulb-studded make-up mirror and, of course, the stage itself, light is the essence of entertainment. And perhaps the overt symbol of excessive energy use.

Large venues, such as the National Theatre, have been addressing this area for some time, spurred on not only by carbon consciousness, but also the cost savings. However, smaller venues often lack the time and money to tackle their carbon footprint. Hence the Ecovenue initiative, spawned by the Mayor of London's 2008 Green Theatre Plan and funded by the European

Tim Atkinson, a lighting designer-turned-energy assessor, is hoping that London's Theatreland can drastically reduce its carbon footprint

Regional Development Fund to the tune of £450,000. The cash will be dispensed by the Theatres Trust, which promotes and protects British theatres.

The Mayor's aim is to dramatically reduce London Theatreland's carbon footprint – estimated at 50,000 tonnes, equivalent to roughly 10% of the capital's bus emissions – as part of his bid to achieve a 60% reduction in the city's greenhouse gas emissions from 1990 levels by 2025.

Through the Ecovenue initiative, 48 smaller London theatres and performing arts venues will receive a display energy certificate (DEC) assessment and advisory report, as well as a full environmental audit, covering areas such as waste disposal, water consumption and use of sustainable materials. They will get a free second DEC a year later to help quantify results and promote achievements.

The man delivering this three-year programme is Tim Atkinson, the trust's theatre building services adviser to Ecovenue. A lighting design graduate from Rose Bruford drama college, and for the past 10 years deputy chief electrician at the Shaftesbury Theatre, he trained as a DEC assessor in 2008, after himself struggling to find information and advice on energy efficiency when he needed it.

Now having to provide this advice to others, he admits to being at the foot of another learning curve. Targets and potential savings are hard to quantify precisely, both because this is new territory and because the idiosyncratic nature of the buildings involved.

A 2008 initial study reported in the Green Theatre Plan offers only a partial breakdown of typical energy use in a theatre – revealing that stage lighting accounts for 9% and exterior lighting 2%, but offering no figures for general and house lighting. The largest tranche of energy use, 35%, goes on auditorium heating and cooling. As Atkinson points out, the study was mainly carried out on West End theatres, which tend to have larger frontages and more impressive displays.

'Research hasn't really been done, and this project will be a learning process as well – we don't know what the savings potentially could be,' says Atkinson. 'It's also hard to generalise because of the huge variety of buildings we're dealing with – theatres over pubs, converted factories, listed buildings. There's no silver bullet which will cover all of them.'

This diversity, coupled with heritage issues and the fact that performance spaces depend on light for evoking atmosphere, means that recommendations might have to be more subtle than simply switching from tungsten to compact fluorescent lamps (CFLs).

'You can't just put energy saving lamps in the auditorium chandelier,' says Atkinson. 'But it may be that cleaning staff use house lights to light the auditorium while they're cleaning it. You might not have to abandon your tungsten lighting there but perhaps adjust when you use it and look at why you're using it. You're sometimes looking for application and usage pattern rather than necessarily looking for an alternative.'

The carrot of the Ecovenue scheme is necessarily complemented by the stick of the EU bulb ban – an issue over which the heritage venues have perhaps been a little ostrich-like.

'There needs to be a serious look at how heritage lighting is affected,' says Atkinson. 'The debate to be had is: which is the overriding factor? Do we want to retain the quality of the design and the aesthetic of a fitting, or do you abandon that for what we're trying to achieve here? That's not been thrashed out yet. That's something we'll have greater insight into by the end of >

CIBSE lighting module

This new module aims to give engineers and project managers with little or no lighting design experience a better understanding of the use of design methods for indoor lighting applications. For full details visit **www.cibsetraining.co.uk/onlinelearning**

HVAC Steps to quick wins

Check the efficiency of electrical equipment – use a 'power factor' survey. Utility providers may offer a power factor survey free or for a reduced charge. Recommended surveyors can be found at: **www.carbontrust.co.uk**

Check the boiler's efficiency rating – new boilers are over 15% more efficient. Boilers have an official efficiency rating from A to G, where A is the most efficient.

Consider fitting a variable speed drive (VSD) – this controls the supply fan motors of any oversized cooling motor and allows for variable levels of air flow to the auditorium. Fitting VSDs will enable you to control the speed of the motor so that it matches the speed of the equipment it is driving.

Install insulation – on internal appliances, external walls, windows and roofs.

Install air quality sensors and temperature sensors – in the auditorium to provide additional control, which will enable the system to run at a reduced rate when the auditorium is not fully occupied.

Source: Green Theatre – Taking Action on Climate Change, 2008, Mayor of London. Visit ***www.london.gov.uk/who-runs-london/mayor/publications/culture/green-theatre-taking-action-climate-change***

> the project I imagine.' Atkinson sees control systems as a key area for improving energy saving. Some venues see them as too expensive, he says, while others don't know how to programme the ones they've got. 'Building management systems remain an unknown and scary area. Some theatres have never looked into getting a decent control system because it's seen as a high upfront cost, without realising that it can give quite a short payback.'

There are also straightforward measures that venues can take, he suggests, as Nottingham Playhouse recently demonstrated. Simply installing a power protection device has cut energy use by 13%.

Energy saving has been Atkinson's speciality, but the Ecovenue remit is a broad one and other sustainability issues will have to be addressed. 'We want to try to get a handle on this. At the moment there's not much incentive when it comes to water, for instance, which is a fairly cheap commodity. We're keen to get people to recognise that there is still a carbon impact, and the same with waste, which covers everything from costumes and props to catering.'

While the Ecovenue scheme will undoubtedly be very useful in terms of the DECs and general audit, it offers no funding to implement recommendations and will also end in 2012. What then? 'There are various initiatives we can point venues towards that they simply won't be aware of,' says Atkinson. 'Some London boroughs offer support, for instance, and we can help them put together applications for Carbon Trust loans. We're in the position to help them inform their five-year plan.'

"Research hasn't really been done, and this project will be a learning process – we don't know what the savings potentially could be"

At the end of the project an external report will be commissioned, and a lasting, useful legacy will be a website offering advice and case history parallels.

Given the 'minimal publicity', says Atkinson, he is encouraged by the 30 applications that have been received so far, though that still leaves nearly two-thirds of the venues that could qualify.

'I think there's already a significant will out there, but in some cases it takes a while to change attitudes. Some things have been done the same way for 50 years and it's like the proverbial turning of the tanker.' ●

www.theatrestrust.org.uk/resources/ecovenue

Case studies

National Theatre: front of house

The National is working with Philips to replace its lighting in a five-year partnership package.

Phase 1: renewal of external lighting, reducing energy consumption of the previous installation by an estimated 50%.

Phase 2: in 2008, tungsten downlights in the foyer of the Oliver Theatre were replaced with LED fittings, a total of 120 units, used on average for 10 hours a day. This cut lighting energy use by 88%, taking annual consumption from 25.5 to 3 MWH and achieving almost 10 tonnes of annual CO_2 savings. It is estimated that annual electricity bills will fall from more than £1,500 to about £185 – an 88% saving. The light source and control gear in the ETC Source 4 Profiles (spots on wall bars) throughout the foyers were switched to 70W Master CDM-T Elite technology. The theatre will save an estimated 90,000kWh (75% reduction) and 39 tonnes of CO_2 per year.

Phase 3: will involve replacing the electronic SEEFACT sign with a Philips Vidiwall. This will result in an estimated reduction of 55% in electricity consumed, saving 30 tonnes of CO_2 per year.

National Theatre: back of house

Because of improvements to discharge technology there is no longer a need to 'warm up' lights to make sure they won't fail during the middle of a show. In 2008, the National experimented with the age-old practice of keeping moving stage lights switched on (and shuttered) for hours before performances. Over 12 days and 18 performances of the award-winning production, *War Horse*, moving stage lights were switched off at the end of the rig check late in the afternoon, until 35 minutes before the show began. Every time, the lights came on cleanly and never failed during a performance. The move created an estimated annual saving of £1,200, or 30% of typical lighting use. Further savings would be achieved in reduced air-conditioning requirements, and from extended lamp life. The move has become standard practice when there is a clear hour between the end of the reset and the re-strike time.

Arcola Theatre

The small independent London venue has embarked on a five-year programme to become the world's first carbon neutral theatre. In 2008, the theatre installed a LED lighting system in the café-bar area. Because of the opportunities to showcase the technology, the lights were supplied free of charge, part of a sponsorship relationship with LED lighting manufacturer, PixelRange. The new lighting system has reduced energy costs in the bar by an estimated 60%, saving 4% of the total annual electricity bill and reducing CO_2 emissions by 628kg.

High-Performance Green Buildings

Find out What's new in Hevacomp

Image courtesy Hamilton Associates

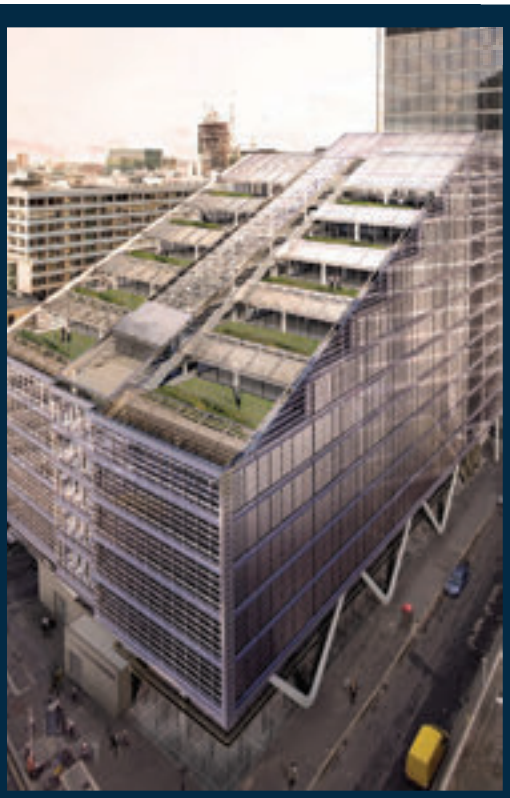

Image courtesy HKR Arhitects

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Photos: courtesy of Siemens

Power of integration

Applying security systems to new buildings and refurbishment offers an opportunity to apply wireless solutions to integrate the property's computer operations. **John Osborne** looks at the pros and cons of this approach

Developments in IT mean there is a greater opportunity to integrate a building's security system with its computer network, including the building management system (BMS). Wireless technologies are at the forefront of such moves towards integration. But integrating various IT operations in a building can bring the risk of total failure if one part of the system goes down.

However, the greater use of wireless internet protocol (IP) services is encouraging clients to integrate their properties' security systems in a computer network. If this integration is set up correctly, there should not be any danger of one part of the system affecting the rest of it, according to experts.

'It really depends on how you set up the system,' says Matt Brittle, head of security consulting at engineering group Atkins. 'If the computer server falls over, all the items should be able to work independently if specified correctly. If it falls over you just lose the integration until you can restore the system. You should be able to operate securely through the function that is each independent element.'

However, integration can present a technical challenge. One issue is that it may be difficult to get the various components in a security system to talk to

A key issue for different types of security system is their interaction with the building management system

one another because of the different interfaces.

According to Matthew Meade of security systems provider Siemens, the main challenge when faced with the integration of products from different disciplines or manufacturers is that they typically use different methods of communication. However, the development of 'open standards' is changing this.

'Open standard communication methods such as OPC [Open Process Control] have enabled the communication between disparate systems to become a far easier task,' says Meade. The use of Ethernet technologies has enabled products that used to use propriety and hard-wired communications to use a common infrastructure.

'If the products are using a common infrastructure, then they are indirectly already connected to each other. They may then just require an interface to convert communication data in one format to another.'

Another important consideration is the type of equipment to use. IP may be the preferred solution for most new-build projects, but there is another option, says Brittle: 'You can run analogue over IP. If people have good quality analogue systems that still have life in them, using something called Codec you can incorporate analogue into IP.' He recommends that clients use IP for new buildings, but says that when refurbishing an existing one, the existing equipment must be evaluated. It may still have some life in it and may still be classed as fit for purpose.

Perhaps one of the best recent examples of what can be achieved when analogue and IP are combined is in Las Vegas, where the new 18 sq m ft CityCenter development is integrating Honeywell's newest IP video technology with analogue video and the facility's IT systems.

'Most newer facilities today will use a mix of both analog and IP video technology, but the key to maximising their advantages is being able to manage both with a single platform,' says Ron Rothman, president, Honeywell Security Group.

Although there may be advantages in integrating security systems into a structure's existing infrastructure and valid reasons for using analogue equipment instead of IP, ultimately the equipment strategy must comply with what Brittle calls the three elements in security. These are technology, operations and procedure.

'If those three are not in balance you could still have a security system that is vulnerable to attack,' says Brittle.

Building management

There are some other important considerations when thinking about integration. According to Siemens' Ian Ellis, who is also president of the British Controls Industry Association, the issues that need to be resolved in any integration project involve the interaction between the security system and the BMS. These decisions need to be agreed with the client before any work is carried out. Ultimately, clients will want to see >

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Monitoring town centres can create challenges because of the large amount of equipment required

> that technology adds value: 'In any integration project it is important that representatives from suppliers of the BMS and security systems are talking as early as possible in the design stage. Most BMS systems use open protocols such as BACNet, LON and KNX, so it will be easier to integrate other devices that use these protocols.'

David Frise, who gave a presentation about the implications of IP for building designers at the CIBSE national conference in April, says that integrating IP with BMS will enable designers to improve communications in an organisation. He adds that there is an opportunity for building services engineers to add value by increasing the efficiency of communications.

However, integration may not be the most appropriate solution. It may be better to keep the security systems separate from the IT architecture in a building. Says Meade: 'Whether you want less integration depends on what functionality is actually required from the system.

'From a security point of view we have to make sure that we are encrypting the information. We have to make sure we are specifying equipment that can't easily be hacked and is robust and reliable.'

Video standards

Siemens supplies local authorities with technology to monitor town centres. This equipment can create challenges for engineers because of the amount of surveillance equipment required. One way of reducing the amount of cabling is to use IP. Meade says IP enables the customer to use cost-effective structured cabling, fibre optic and wireless transmission technologies to distribute their video data.

'We incorporate IP into most new designs because it gives greater flexibility of control and the ability to distribute control and monitoring,' says Meade. 'You could have a second monitoring room. For a large urban system it is often necessary to have a second control point in case there is a major incident.'

By distributing the monitoring aspect to different stakeholders, says Meade, the system delivers more than just security – management can observe the behaviour of staff, and engineers can observe equipment remotely. 'By using video data and data provided by other systems such as an alarm the actual status is made far clearer and false assumptions are reduced.'

In future it should be easier to put IP into a building because of the drive to implement open standards for video. 'The main mover in the industry is to develop a standard for video,' says Meade. ●

Case study New stadium benefits from integration

The new Aviva stadium in Dublin has a security system that is integrated into the building's infrastructure. The fire detection, CCTV, access control, intruder alarms, gas extinguishers and disabled toilet alarms are all integrated with the stadium's Local Area Network (LAN) and IT infrastructure, says ADT, which manages the system.

This integration enables security operators or police to monitor and control each component from centralised workstations across the site, streamlining this process and helping to improve the efficiency and response time of operators to potential incidents, according to ADT. Another benefit of integration is that the control systems are easily moved, the company says.

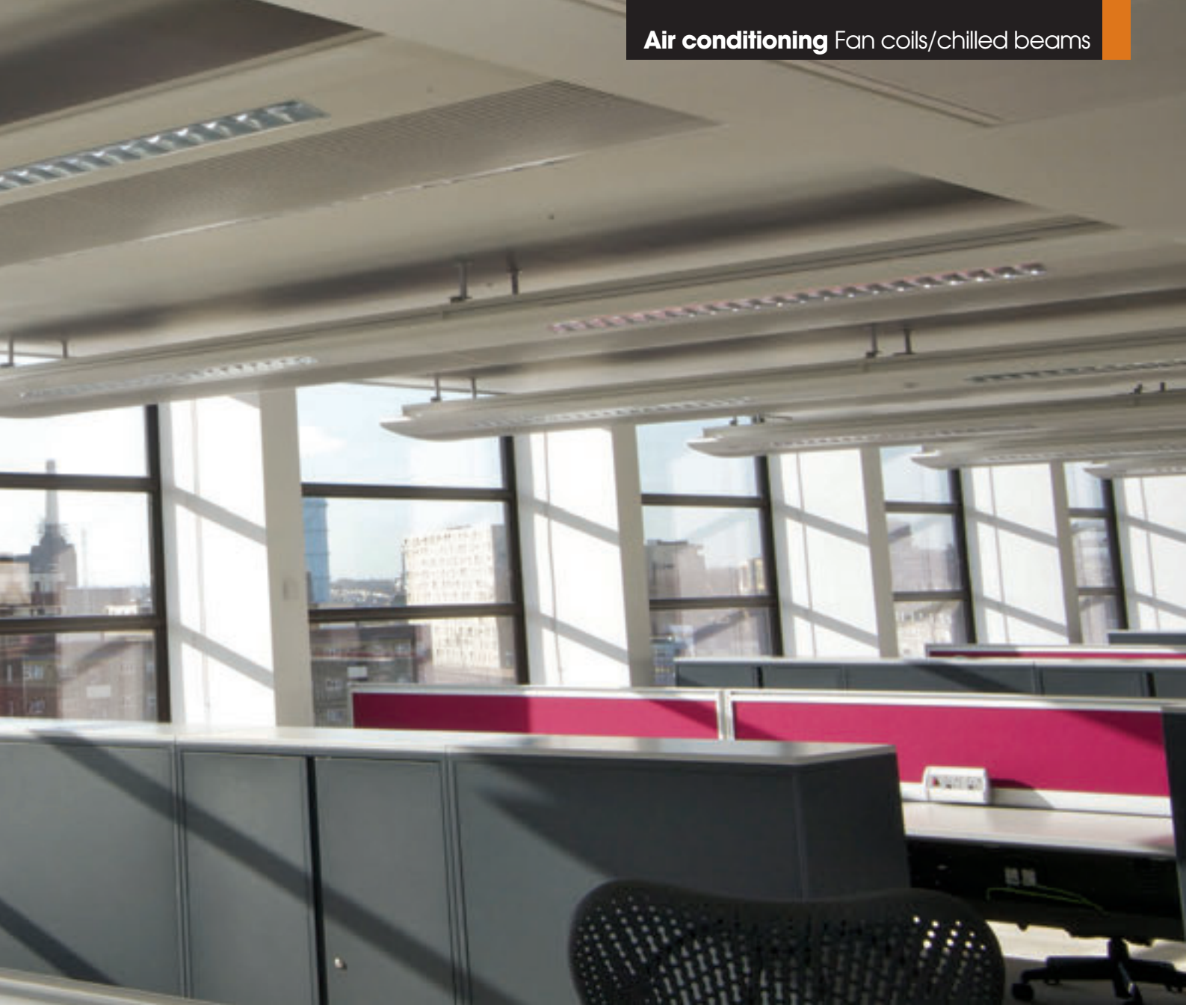
The stadium's security system also demonstrates the advantages of installing wireless Internet Protocol (IP) technology, says ADT Ireland's Donal Colfer: 'We said that if we changed the system to IP instead of running co-axials and data cables all over the place, we could reduce the impact of cabling.

'The access control is completely IP and the cameras are IP network video recorders. The IP was plugged into the LAN. The LAN in this case is fibre.' He adds that there is some copper: 'The cameras are Power over Ethernet. That reduces the requirement to put in a 240 volt cable for each camera' – which has the added benefit of helping to reduce power consumption.

TROX UK

When the fan fits...

Specifiers often face a choice between fan coils and chilled beams when considering a project's air management requirements. **Ian Vallely** takes the temperature on how the systems are viewed



Chilled beams were installed in the London headquarters of the National Audit office

The fan coil unit is a well-established terminal system for controlling room temperatures and comfort. But it has a rival in the form of the chilled beam, and the two systems have been vying with each other for specifiers' attention for a number of years.

But comparison between the two is complicated by the fact that a fan coil unit has a single function, while chilled beams can be integrated with other building services to create multi-service chilled beams.

According to Mike Beeton, business development manager for systems at Halton Products: 'If chilled beams were superior in every way, they would have completely replaced fan coils in new-build projects by now.'

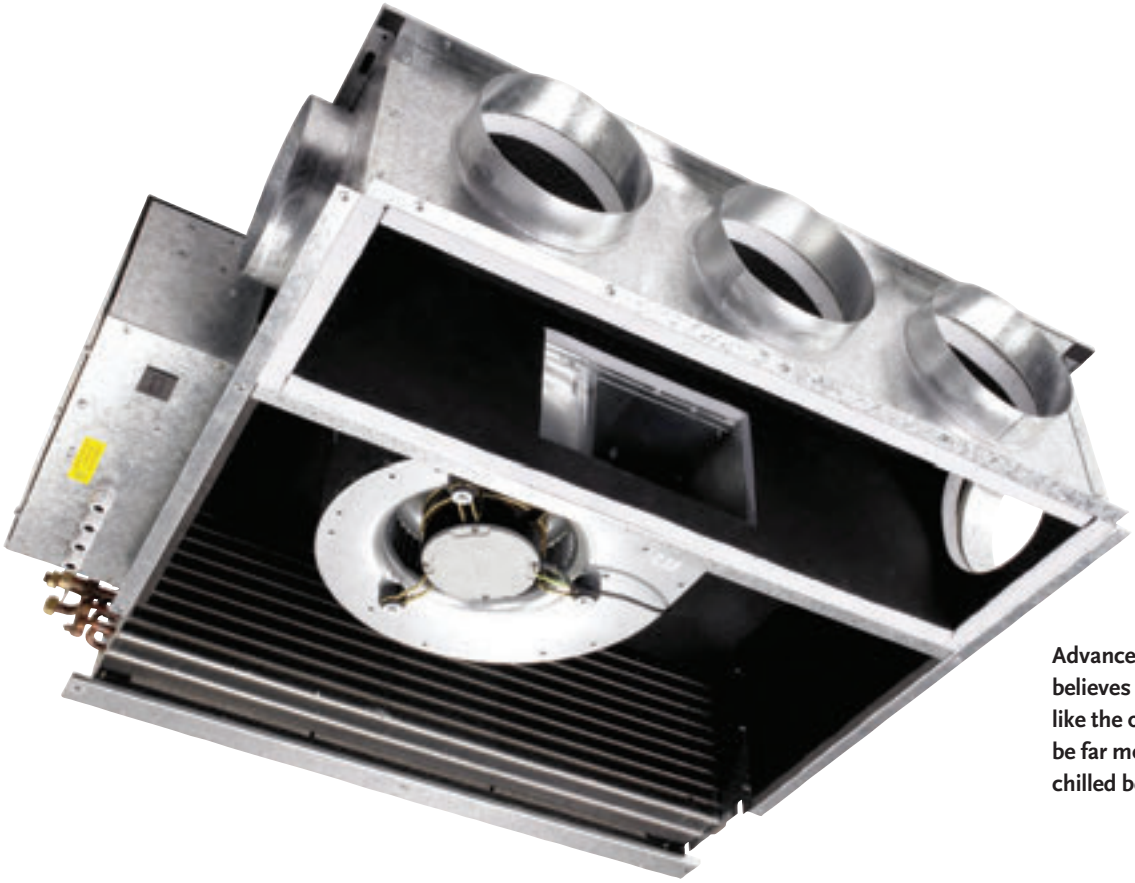
He says that one of the main drivers of chilled beams' growth in popularity is the changing legislative and cultural environment. He says: 'New regulations promoting energy efficiency – such as Approved Documents L2A, governing conservation of fuel and power – are leading to greater demand for water-based cooling. Such systems need less energy to provide the cooling requirement than cooling through the air.' He believes another major factor in the shifting market is the gradual disappearance of inaccurate preconceptions about chilled beams, chiefly concerning cost and flexibility.

'While acknowledging their popularity elsewhere and generally accepting their low running costs, UK specifiers had considered chilled beam systems as expensive to install. This meant that the capital cost had deterred specification of chilled beams for "normal" projects.

'They had tended to be considered only for such major clients as banks and blue-chip companies, despite offering a lower lifecycle cost than four-pipe fan coils and other alternative systems.'

These perceptions have arisen, he claims, because of the way in which systems had been specified. But growing emphasis on carbon and energy is now forcing people to think beyond lowest cost first and to consider operatoinal performance and energy use.

'Designers of such spaces as open-plan offices have tended to minimise costs by opting for 4 to 6kW fan coil units. To supply an equivalent cooling load would normally require three or four chilled beams for >



Advanced Air UK

Advanced Air UK believes that fan coils, like the one pictured, can be far more flexible than chilled beams

> every fan unit. In such a case, the initial costs solely for the units would be two to three times higher. This overlooks a potentially significant saving available with chilled beams.' However, Andrew Sargent, general manager of Advanced Air UK, which offers both types of system, insists that fan coil units' advantages over chilled beams don't stop at lower capital cost: 'Fan coils are far more flexible in terms of churns and changes to the office layout.

'Because they are located in the false ceiling, there is a lot more latitude in terms of where you can place the partitioning, and that appeals to the property developer who wants to provide a building that is totally flexible.'

Another critical issue, he says, is the ability of fan coils to deal with a wide range of cooling loads: 'For example, if you had a meeting room and you had a sudden influx of people, a fan coil can respond quickly. It is more responsive and you can get much higher cooling load out.'

According to David Garwood of research body BSRIA: 'In recent years the market has seen a growth in the more energy-efficient EC (electronically commutated) fan coils. These, until recently, have commanded a premium of around 20 per cent.

'However, those companies that have been able to sell the EC fan coil in sufficient quantities have been able to achieve the economies of scales and so the price difference is now minimal. As EC fan coil sales increased, the cost of the motors has come down.'

Sargent claims that fan coils are set to grow further in popularity because EC motors and variable air volume are significantly cleaner than they once were. He says: 'One of the main reasons for using chilled beams instead of fan coils previously was the carbon emissions argument. Now that this has been neutralised, there is a great swing of opinion towards fan coils.'

TROX UK components product manager Ian Thomas adds: 'The most significant issue in the short term is the change of fan coil specific fan power [a function of the volume flow of the fan and the electrical power input] from 0.8 to 0.6W/l/sec under the 2010 version of Part L.'

He argues this will probably lead to more EC motors being fitted into fan coils: 'The regulation is not specific about the type of motor you use, provided you get to the specified level of efficiency, but it is far easier to get this with EC than with an AC version. And, with EC motors, you have the opportunity to vary air volumes according to demand.'

Although he admits there is a cost premium on EC motors over AC versions, Thomas says: 'With more and more people coming to the market with EC solutions, we now have greater competition [which will have a downward impact on the price]. Besides, the higher capital cost is negated by savings over a two- to three-year period, depending on the price of electricity.'

This means the gap in energy consumption between fan coil units and chilled beams 'is the smallest we have ever seen'.

Others, however, are less upbeat about fan coil units. Martin Proctor, product manager – waterborne climate systems at Swegon, says: 'I think that fan coils still have the edge in terms of market share, but that we are reaching a pivotal point where the already significant move away from fan coil units and towards chilled beams – particularly four-way comfort modules – will see chilled beams take over from fan coil units.'

"If chilled beams were superior in every way, they would have completely replaced fan coils in new-build projects by now"
– Mike Beeton

Water-based cooling using chilled beams provides a more energy-efficient solution, says Halton Products

> And Chris Pinn, national sales manager of Dunham-Bush, adds: 'With the market going through a "lick and stick" phase due to current uncertainty, fan coils are still pushing forward within the refurbishment sector. I do, though, see the chilled beam market picking up when the new Part L comes in and the SFP [specific fan power] and carbon emission reductions take effect.'

Ian Lees, sales director of Krantz Systems UK, agrees that fan coils are putting up a brave fight: 'Consultants that have used fan coils before without problems are likely to use them again. However, you also get consultants who are keen to use the next new thing and enough people have used chilled beams and been satisfied with them that they are becoming the system of choice for the right reasons – they are a high-quality, energy-efficient system.'

For Lees, it is a mistake to look at the design only in terms of the terminal devices: 'You cannot make a poor-quality building energy-efficient by simply adding chilled beams – these are one of the components in an energy-efficient building, but they are not what make it an energy-efficient building.'

Linden Shuttleworth, UK sales manager – Flakt System Products, sees a boost in refurbishment in the coming two years: 'And, with the needs of lower energy targets with the European Energy Performance of Buildings Directive in mind, both fan coil unit and chilled beam systems will go into "demand controlled ventilation" designs, with sensors within the space varying air volume from the main plant for chilled beams and from the room fans in fan coil units.'

Many consultants, he says, have accepted the need for 'load lopping' or 'peak clipping', whereby they 'stop adding in their traditional 10% safety margins and not designing on ridiculously high ambient temperatures of 35 deg C'.

On top of this, he adds, clients are demanding lower cooling loads on the system by tracking the internal and external temperatures and using 'load shifting' (saving cooling energy by cooling storage with exposed masses and night time cooling). As a result, 'chilled beam use will increase as the running costs on the fans and chillers fall significantly'. ●

> **"The most significant issue in the short term is the change of fan coil specific fan power under the 2010 version of Part L"**
> – Ian Thomas

Pros and cons of the two systems

Chilled beams

A chilled beam is a building cooling device that circulates air using the principles of natural heat convection. Typically mounted overhead near or within a ceiling, the beam is a type of radiator, chilled by an external source such as recirculated water. It cools the space below it by acting as a heat sink for the naturally rising warm air of the space. Once cooled, the air naturally drops back to the floor where the cycle begins again.

Advantages

- Typically more energy efficient than fan coil units
- Quieter because they have no moving parts
- Require little maintenance
- No need for condensate drainage pump and pipework

Disadvantages

- Requires a good external structure to the building to maintain effective humidity control
- Chilled beams are generally unsuitable for ceilings higher than 4.5m
- They respond relatively slowly to varying cooling loads

Cooling capacity

- Chilled beams assisted with displacement ventilation: 70 to 120 W/sq m; active chilled beams: 120 W/sq m

Fan coil units

A fan coil unit is placed at each place which needs to be heated or cooled. A central plant delivers hot or cold water to fan coil units. The fan draws air from the room, blows it over the water coil and returns it to the room. Dehumidified air from a central plant or fresh air from outside may also be used by a fan coil system

Advantages

- Building zones can be individually controlled, allowing unoccupied areas to be isolated and shut down
- Central equipment may be sized smaller by taking advantage of building heating and cooling diversity
- Electrical wiring and water pipes are simpler to install than ducts, making retrofitting easier
- Fan coil units do not require humidity control

Disadvantages

- Require more maintenance than chilled beam systems
- Condensate must be drained from each individual unit
- Noisier and require more maintenance than chilled beams
- Typically require more complex control systems

Cooling capacity

- This can range between 3kW and 14kW

Sources: Pros and cons – contributing companies. System descriptions – CIBSE. For more detailed information, see CIBSE Guide B, Heating Ventilation Air Conditioning and Refrigeration, available from www.cibse.org/bookshop

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Hurricane conditions are no problem for Bilco

Bilco has become the first manufacturer of roof hatches to pass the revised requirements of the Florida Building Code.

The Florida Building Code was revised in 1992 following hurricane Andrew. In 2007 roof hatches were added to the list of products that are required to be tested to high velocity hurricane zone standards. Bilco subjected four of its most popular roof hatches to a battery of tests and all four units survived impressively well. These Bilco products are the only roof hatches to have received Notice of Approval in Florida, which signifies full compliance with the Florida Building Code.

● **For more details visit bilcouk@bilco.com**

Samsung splits provide comfortable solution for hotel

A popular Wiltshire hotel has selected Samsung air conditioners to provide cost effective cooling and heating in guest rooms.

The South Marston Hotel and Leisure Club has installed individual 2.6kW Samsung consoles to upgrade 40 of its 60 rooms. The inverter controlled split systems deliver 2.6kW cooling and 3.5kW heating, with impressive efficiency ratings of 4.0 and 3.93 respectively. At just 199mm thick, the slimline Samsung consoles integrate unobtrusively into any décor and with silent operation – just 23dB – they are easy on the ear too. Two separate outlets for heating and cooling ensure efficient distribution of either warm or cool air.

● **For more information visit www.samsungac.co.uk or call 01932 455000**

Armstrong extends sensorless control variable speed pumps range

In response to strong customer demand, Armstrong has extended its award-winning IVS range of integrated Sensorless control pumps (previously available up to 7.5kW) to include models with variable speed drives up to 55kW. The pumps are Armstrong's Series 4300 and 4302 models – now a HVAC industry standard – incorporating integrated inverters that automatically calculate the building's demand and adjust the speed of the drives accordingly.

● **For more information call 0161 223 2223 or visit www.armstrongintegrated.com**

Grundfos delivers a swell solution

As an island nation, having an improved understanding of the seas around our coasts is vital. SAMS (the Scottish Association for Marine Science) is one the UK's leading independent marine research organisations. It has recently invested £5m in a new teaching and visitor centre. Grundfos Pumps, working in conjunction with contractors, Hulse Building Services, and consultants Hurley Palmer Flatt, helped ensure that the complete pump solution provided would meet the high standards set by SAMS.

● **For more information call 01525 850000 or email uk-sales@grundfos.com**

New improved GasSaver

Changes made to Alpha Heating Innovation's GasSaver flue heat recovery unit enhance its appearance and cut down installation times. GasSaver's design has been brought into line with that of Alpha's boilers. With its gloss, white casing and curved edges, it looks the perfect match – creating an overall look that's far more cohesive and pleasing to the eye. This, of course, is particularly important with installations that are not hidden away in a cupboard.

● **For more information call 01732 783001 or visit www.alpha-innovation.com**

Electric boilers and water heaters from Atlantic

Atlantic Boilers is a supplier of condensing and highly efficient boiler-plant. Its range includes Compacte, an electric boiler with a small footprint. Floor-standing, it is economic to install and run, and has no flue requirements. It has a maximum working pressure of 4 bars. Multi-Elec is a floor-standing electric boiler with an output of up to 600kW. It has a small footprint, and comes as a complete package with a control panel. Multi-Elec is offered in 19 models to suit different output and installation needs.

● **For more information email info@atlanticboilers.com or visit www.atlanticboilers.com**

HCP launches a Radiant Heating Service Raft

HCP, the specialist heating division of SAS International, has launched a Radiant Heating Service Raft. This innovative product has been developed in accordance with SAS International's System 600 acoustic lighting raft. Traditionally, radiant heating panels or tiles have been used in suspended ceilings, but integrating radiant heating panels into acoustic lighting rafts offers further design flexibility. These service rafts are freely suspended below coffers, leaving large areas of the concrete soffit exposed, enabling free air movement to the structural slab for natural thermal mass cooling.

● **For more information visit www.hcp-sasint.co.uk**

New PopPack: a world of difference

Thorn's all-new PopPack, the 16th generation of the world's best-selling light fitting, is poised to change how contractors view fluorescent lighting. Suddenly, instead of the standard batten fitting, which has been unchanged for decades, there is a luminaire with a quicker installation sequence, easier electrical connection, rapid authentic emergency conversion, and straightforward presence and daylight detection – all in addition to T5 or T8 lamps and a wider range of attachments for commercial and industrial requirements.

● **For more information visit www.thornlighting.co.uk**

TITAN Products expands energy-efficient BACnet range

TITAN Products announces the release of two new BACnet enabled control products operating to ANSI/ASHRAE Standard 135. The CCI-2X485 is a Modbus to BACnet gateway with a 128 Modbus object mapping capability and designed to interface third party Modbus control products onto a BACnet system. The CCI-2242 BACnet controller is a multi-purpose product with inputs and outputs that can be used to monitor and control building services plant or configured to customer specific applications.

● **For more information visit www.titanproducts.com or call +44 (0)161 406 6480**

Classroom ventilation units

Aircraft Air Handling's 260mm-high classroom ventilation units: silenced to nr25; plate recuperator 60 per cent efficient; air volume 0-500 litres. Heating: LPHW/ELECTRIC. Cooling: CW/DX. Larger air volumes and bespoke units are available.

● **For more info visit www.aircraftairhandling.com**

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Evaporative cooling enhancement on air cooled chillers

How can evaporative cooling deliver improved performance, and what are the cost implications? These are some of the issues examined in this month's article, which follows up a previous CPD on chillers

This month's article features a further improvement to the performance of air cooled chillers in the form of evaporatively cooling the fresh air intake to the condensers. The theory of evaporative cooling will be presented, together with the improved performance data and an application into modular data centre air conditioning packages.

This follows on from the CPD article in the July 2009 *Journal*, which introduced several innovative improvements to the performance of centrifugal compressor water chillers. These included:

- Magnetic bearings within the compressor;
- Oil free compressor;
- Floating head pressure;
- Micro-channel aluminium condensers, that reduce refrigerant charge while increasing the effectiveness of heat exchange;
- Flooded evaporators that ensure optimum energy transfer between refrigerant and water;
- Inverter-controlled compressors whose output can be matched to the load; and
- Use of a liquid refrigerant pump system that significantly increases thermodynamic efficiency across the chiller's operating range.

Evaporative cooling systems

Evaporative cooling is achieved with a cassette made from inorganic, non-combustible packing material, which is a resin coated board – one that is fireproof and will not support bacterial growth. Figure 1 shows the typical air cooled chiller arrangement. The cassettes are set in front of the V bank epoxy coated condenser coils and can be slid out for replacement or winter operation to reduce fan pressure drop.

The system incorporates a once-through water system with micro jet spray nozzles, which means that only the minimum amount of water is used with the water being pumped by a variable speed drive pump, through a UV filter to kill all bacteria.

The sprayed water flows onto the corrugated surface of the cassette material and saturates the material, but without passing through and coming into contact with the condenser coils.

As the warm, dry ambient air passes through the cassette it evaporates a proportion of the water, lowering the air dry bulb temperature and raising the humidity. The fans are variable speed drive with electronically controlled motors to reduce energy usage. Approach temperatures between refrigerant condensing temperature and air onto the coils are reduced by up to 8K at peak design conditions (35C ambient). Condensing temperatures are reduced and condenser fan volumes also lowered, so energy savings can be very significant. Utilising the flow/power cube law, savings of up to 30% are possible.

The evaporative unit can be automatically switched off at lower ambient conditions, when water cost equals or is greater than potential energy savings. Excess water assists in washing the media, and is drained back >

> from the cassettes. It also allows the use of water straight from the tap with no need for water treatment (i.e. demineralisation plants). Minerals and pollutants stay behind in the cassette material to be washed away with the discharge water, keeping the total humidification process pure.

The theory of evaporative cooling

Figure 2[1] shows air passing through a water spray chamber, which could also be the corrugated packing medium saturated and sprayed from the micro jet nozzles in our application. Text books refer to air passing over or through a wetted surface.

This process results in heat and mass transfer and can be represented by the 'straight line law'. This law states that when air is transferring heat and mass (water) to or from a wetted surface, the condition of the air at point A, shown on the psychrometric chart, drives towards the saturation line at the temperature of the wetted surface. The condition of the air leaving the spray chamber or wetted surface at point B has dropped in dry bulb temperature and increased in humidity or moisture content. The straight line law states that point B lies on a straight line drawn between point A and the saturation curve at the wetted surface temperature at point C. The warm air at point A dry bulb temperature drops when in contact with the water at temperature tC. This application of heat and mass transfer is one of the most complex encountered in heat exchange theory, but this article will consider the underlying application of the basic principles. Further reading on this is given at the end of the article.

The process that is taking place is known as *adiabatic saturation* and as such occurs without any external exchange of heat into or out of the system. Air at the start of the process is at a dry bulb temperature tA and moisture content gA and as it passes through the saturated cassette, water is evaporated from the surface of the cassette material so that the air leaving the cassette and entering the condenser coil, in our case, has a dry bulb temperature tB and moisture content gB. For water to evaporate, heat must be supplied and, in an adiabatic process, this heat can only come from the air itself. The latent heat of evaporation gained by the air must equal the sensible heat loss by the air, which means there will be a drop in air dry bulb temperature to compensate for the increase in moisture content:

i.e. $(g_B - g_A)h_{fg} = C_{pair}(t_A - t_B)$

The theoretical process line follows the adiabatic saturation temperature (which may be assumed to follow the wet bulb temperature lines that are printed on the psychrometric chart). But a close approximation, which usually assists psychrometric calculations, is to consider the process as a constant enthalpy one.

The main factors that affect the performance of the cassette in reducing the ambient dry bulb temperature entering the condenser coil are:

- **Ambient air wet bulb temperature:** At summer ambient conditions of say 30C dry bulb, 20C wet bulb, air leaves the cassette and enters the condenser coil at approximately 23C. The lower the actual ambient wet bulb, the more the potential for the dry bulb to be reduced, but of course, the opposite is also

Figure 1: Typical air cooled chiller arrangement

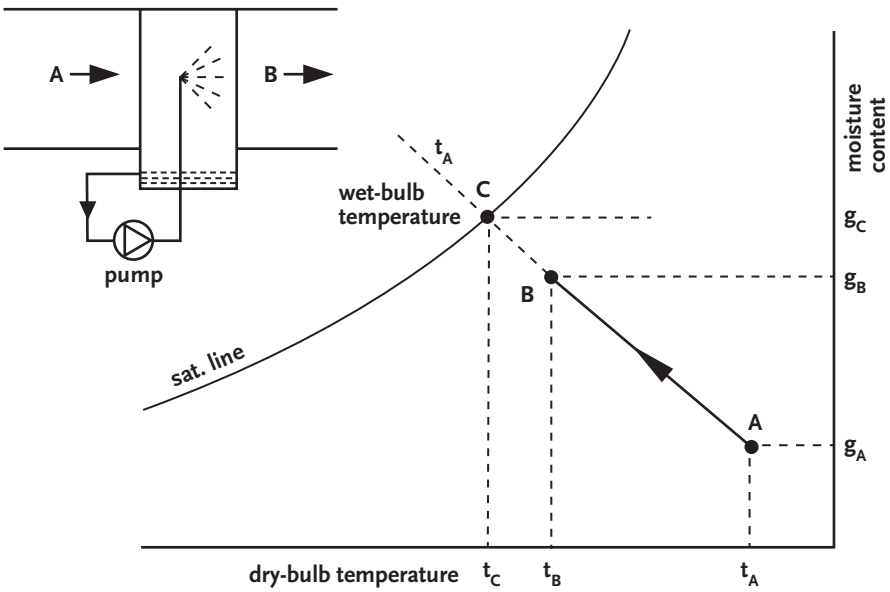

Figure 2: Psychrometric chart for evaporative cooling process

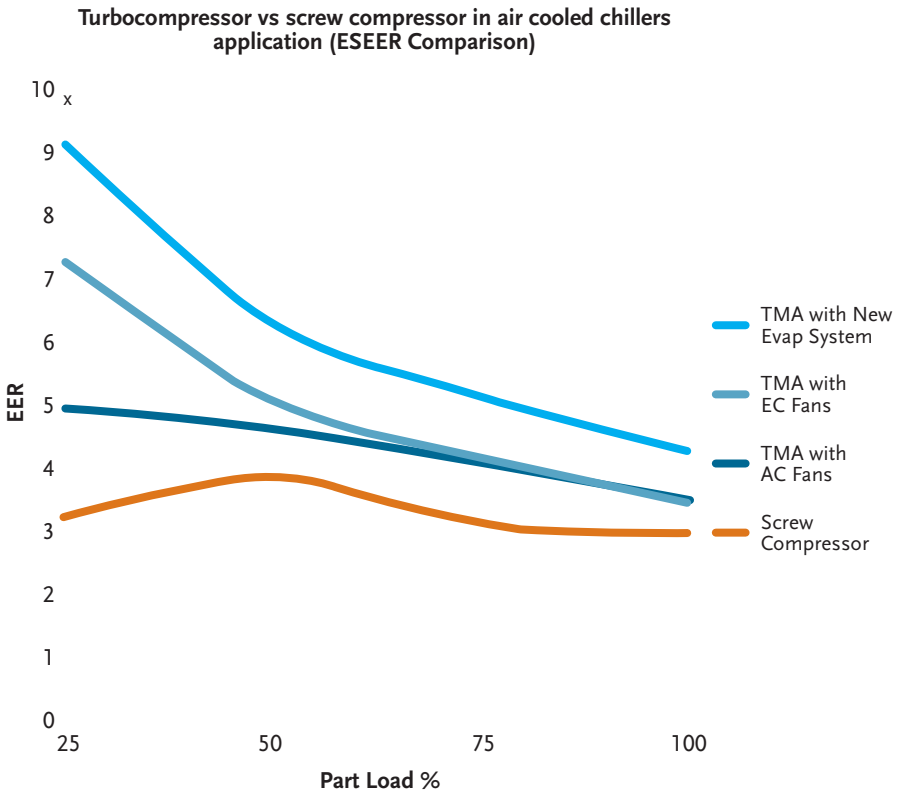

Figure 3: Efficiency comparison between turbo and screw compressor

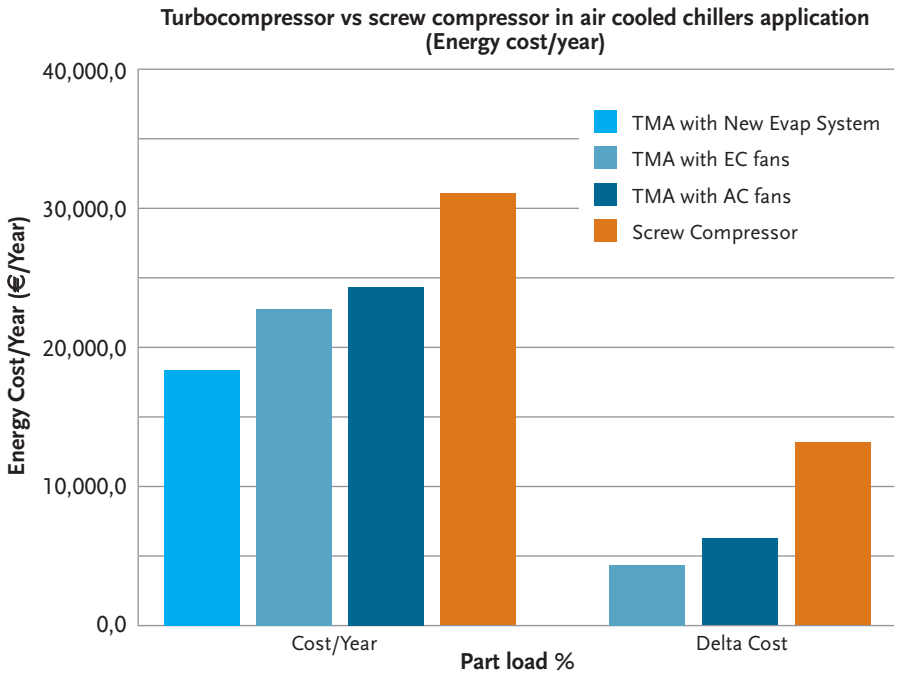

Figure 4: Annual energy cost comparison

true. The more humid, and hence the higher the wet bulb temperature of, the ambient air, the less dry bulb reduction will occur.

• **Cassette contact factor:** Looking at the psychrometric chart, if the saturation were 100%, the air entering the condenser coil would have a dry bulb temperature equal to the wet bulb temperature.

In reality the efficiency, or contact factor will be 85% to 90% so the dry bulb temperature of the air leaving the cassette will practically 'approach' but not get as low as the wet bulb temperature.

Enhanced performance data

Figures 3 and 4 illustrate operating efficiencies in terms of the EER(Energy Efficiency Ratio) and Energy costs between the new centrifugal air cooled chiller with evaporative cooling and a typical air cooled screw chiller. Data from a 500kW air cooled centrifugal chiller with evaporative cooling indicate a 26kW saving in power consumption compared to the same chiller without the evaporative cooling, and a saving of 52kW over a screw compressor chiller. There is a requirement for between 360 and 490 l/h of make up water for the evaporative cooling system.

The overall annual running cost for the enhanced chiller is £16,000, a reduction of £3,200 over the non enhanced centrifugal chiller and a reduction of £10,600 over a screw compressor chiller.

Application to data centre air conditioning

Data centres are an application of building services where it is being proposed that the whole project be built from pre-manufactured, pre-assembled components (in fact, not just the services, but the complete building). Known as ITPACs (IT pre-assembled components) the modules are not containers in the traditional sense, but are pre-configured, manufactured components, pre-assembled and delivered to any site around the world. As part of this scheme, modular cooling plant in 300kW packages is being developed and produced.

The air cooled chiller section can include the evaporative cooling cassettes for improved performance. Conditioned air is ducted from the air handling unit section to discharge under-floor in the data centre sections and ducted from high level back to the air handling unit/fresh air intake. Further enhancements to the air handling package include an adiabatic heat exchange unit in the return air section, with sensible heat transfer to the fresh air supply providing initially free cooling from the outside ambient, then adiabatic cooling, then liquid pressure amplification(LPA) free cooling and finally mechanical cooling from the centrifugal compressor.

References:

1. *Air Conditioning Systems – Design, Commissioning and Maintenance*, Legg RC, Batsford, 1991
2. *Refrigeration and Air Conditioning*, McGraw Hill, Stoecker and Jones
3. Geoclima: Evaporative systems
4. Geoclima: Turbomiser performance data
5. DataCentreDynamics *Focus*, April/May 2010 'The new future of data centres'

Module 18

July 2010

1) Which of the following does not form part of an Evaporative Cooling System?

- ☐ A Cassette corrugated material
- ☐ B Variable speed water pump
- ☐ C UV filter
- ☐ D Micro jet spray nozzles
- ☐ E Condenser cooling coil

2) An Adiabatic Saturation process occurs:

- ☐ A when dry bulb and wet bulb temperatures are equal
- ☐ B without any external heat transfer into or out of the system
- ☐ C when moisture content before and after the process is the same
- ☐ D when water vapour is evaporated from a wet surface
- ☐ E as ambient air passes over the condensing coil

3) Which of the following is a factor that affects the performance of an evaporative cooling system?

- ☐ A Ambient dry bulb temperature
- ☐ B Chiller condensing temperature
- ☐ C Chilled water temperature
- ☐ D Evaporative cassette contact factor
- ☐ E Energy efficiency ratio

4) What is the Energy Efficiency Ratio (EER) of a turbocompressor (TMA) with evaporative cooling system, at 50% part load?

- ☐ A 5.4
- ☐ B 4.6
- ☐ C 3.8
- ☐ D 8.6
- ☐ E 6.3

5) This feature is not one that will improve the overall performance of an air cooled chiller:

- ☐ A evaporative cooling on ambient air to the condenser
- ☐ B liquid pressure amplification
- ☐ C fixed speed condenser fans
- ☐ D return air/fresh air supply heat exchanger
- ☐ E ambient free cooling

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Alternatively, you can fill in this page and post to:
N Hurley, CIBSE, 222 Balham High Road, London, SW12 9BS

Events & Training

NATIONAL EVENTS/ CONFERENCES

● **07 Jul 2010 More effective air conditioning inspections: lessons from Harmonac** Watford
Discussing the project's findings. www.harmonac.info

● **22 Jul 2010 Improving the energy performance of historic buildings** Reading
Topics include energy, climate change and renewables. adam.turner@inst.riba.org

● **08-09 Sep 2010 Energy Insight** Birmingham
Security of supply. www.theenergyevent.com

● **15-16 Sep 2010 World Green Roof Congress 2010** London
Research/leading applications. www.worldgreenroofcongress.com

● **22-24 Sep 2010 National Housing Federation Annual Conference** Birmingham
Affordable housing event. www.housing.org.uk

● **06-07 Oct 2010 Bioenergy 2010** Warwickshire
Staged alongside EBEC. More details soon. sjfreni@r-e-a.net

● **12 Oct 2010 Hinton Lecture and Dinner** London
Speaker Dr Lyn Evans. Helen. berrington@raeng.org.uk

SOCIETY OF LIGHT AND LIGHTING

Visit the SLL pages via www.cibse.org

● **07 Oct 2010 SLL Masterclass – The Low Carbon Challenge** Birmingham
Julie Kane, sll@cibse.org

● **19 Oct 2010 Energy in Lighting** London
How will our carbon reduction commitment impact on design and the application of lighting? Julie Kane, sll@cibse.org

● **28 Oct 2010 SLL Masterclass – The Low Carbon Challenge** Leeds
Julie Kane, sll@cibse.org

CIBSE REGIONS

● **07 Jul 2010 Social event** London
An evening gathering. Contact pryan@patrickryanassociates.com

● **20 Jul 2010 CHP, the next generation?** Brentwood
Joint meeting with CIBSE Energy Performance Group. Contact Alex Hill: 01322 289977

● **21 Jul 2010 Crossrail – the story so far** Croydon
jzhang2005@yahoo.co.uk

● **21 Jul 2010 Solutions for Healthcare and Infection Control** Manchester
Speakers: Chris Hayes and Richard Stammers. Malcolm Atherton 0161 872 4811 or m.atherton@dssr.co.uk

● **12 Aug 2010 North east region annual golf day – the CIBSE Trophy** Stableford
Guests welcome. John Carr, carr-john@sky.com

● **17 Aug 2010 Zero carbon buildings workshop** Brentwood
Half-day workshops with buffet lunch. Alex Hill 01322 298977

● **15 Sep 2010 The benefits of stainless steel in above- and below-ground drainage applications** Manchester
Speakers: Frank Netherwood and Simon Vautrey (Blucher UK). Malcolm Atherton 0161 872 4811

● **21 Sep 2010 UPS and IT Data Centres** Northampton
Further details to be advised. Densel Davy: denseldavy@ntlworld.com

● **17 Nov 2010 Energy Efficiency Opportunities from Zip Heaters** Manchester
Speaker: Adrian Hippert (Zip Heaters UK). Malcolm Atherton 0161 872 4811 or m.atherton@dssr.co.uk

CIBSE/OTHER TRAINING

● **12-16 Jul 2010 BSEN 16001 Training** London
Learn how to implement this new energy management standard. www.cibsetraining.co.uk

● **19-20 Jul 2010 LCC/EPC training course** London
For those wishing to become Low Carbon Consultants/Low Carbon Energy Assessors. www.cibsetraining.co.uk

● **21 Jul 2010 Air conditioning inspection training** London
How to undertake inspections. www.cibsetraining.co.uk

● **21-22 Sep 2010 LCC/EPC training course** Birmingham
For those wishing to become Low Carbon Consultants/Low Carbon Energy Assessors. www.cibsetraining.co.uk

● **07 Sep 2010 Air conditioning inspection training** London
How to undertake inspections and become accredited by CIBSE. www.cibsetraining.co.uk

CPD TRAINING

Visit www.cibsetraining.co.uk, call 020 7675 5211 or email eventbookings@cibse.org

BUILDING REGULATIONS AND ENERGY EFFICIENCY

● **05 Jul 2010 Part L Building Regulations 2010** London

● **12 Jul 2010 Part L Building Regulations 2010** Newcastle

● **08 Sep 2010 Part L Building Regulations 2010** London

● **14 Sep 2010 Part L Building Regulations 2010** Manchester

● **22 Sep 2010 The Carbon Reduction Commitment (CRC)** London

● **23 Sep 2010 Energy Strategy Reports** London

● **28 Sep 2010 Part L Building Regulations 2010** Birmingham

ELECTRICAL SERVICES

● **07-09 Jul 2010 Electrical Services Explained** Manchester

● **28-30 Sep 2010 Electrical Services Explained** Birmingham

MECHANICAL AND FACILITIES SERVICES

● **06-08 Jul 2010 Mechanical Services Explained (Three-day course)** London

● **15-17 Sep 2010 Mechanical Services Explained** Birmingham

● **15 Sep 2010 Designing of heating and chilled water pipesystems** London

● **16 Sep 2010 Design of ductwork systems** London

Send your event details to **cbailey@cibsejournal.com**

CIBSE throws its weight behind IAQ 2010

CIBSE has announced that it is to co-sponsor the next ASHRAE IAQ Conference, to be held in Kuala Lumpur, Malaysia, from 10 to 12 November.

As a co-sponsoring body, CIBSE is keen to invite its members to submit abstracts to the Conference Planning Committee.

Frank Mills, the institution's representative on the IAQ 2010 Conference Committee, is also considering a proposal to run a workshop on the theme of 'the role of natural ventilation for airborne infection control', and would welcome being contacted by anyone who might want to assist.

Mills anticipates that there will be four presentations within the workshop.

He said: 'I will be attending the next IAQ 2010 planning panel at the ASHRAE meeting in Orlando and would be grateful if anyone submitting an abstract could copy me in – at **famills@skm.co.uk** – so that I can track its progress.

'CIBSE has an impressive track record in submitting excellent papers to specialist conferences of this type, and I look forward to seeing what we are able to offer on this occasion.'

The IAQ Conference will be held in Kuala Lumpur in November

IAQ 2010 is the 16th in the ASHRAE IAQ Conference series, which started in 1986. This will be the first IAQ conference hosted outside the United States.

The focus of the event will be airborne infection control, and will explore related questions on the role of HVAC in airborne infections disease transmission, evaluation of the various design and control strategies and technologies, pandemic preparedness, and airborne infection control.

www.ashrae.org

CIBSE JOURNAL

Future features in CIBSE Journal

August 2010	Heat pumps and combined heat & power Facades engineering
September 2010	Air movement & ventilation Public health engineering*
October 2010	Industrial & commercial heating Water conservation
November 2010	BMS & controls Lighting*
December 2010	Pipework (inc: pumps, valves, UFH & controls) Combined heat & power

* = Supplements

Editorial submission: Please send editorial proposals/ideas three months before publication date, eg, 1st October for January publication. Send to: editor@cibsejournal.com. The final editorial copy deadline is one month before publication date.

For advertising opportunities contact:

Jim Folley – 020 7324 2786
or email jim.folley@redactive.co.uk

Darren Hale – 020 7880 6206
or email darren.hale@redactive.co.uk

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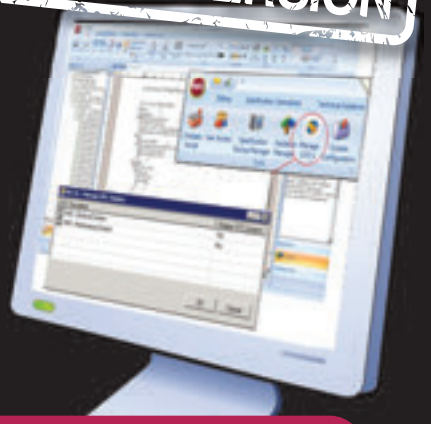

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Ref: BAR669

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Ref: BAR459

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Ref: BAR406

For further information and to apply please call us on 0845 519 4455 or email your details to cv@b-a-r.com

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To download our application form from the website please visit www.workfornorthumbria.co.uk or call us on (0191) 227 4321 for an Application Pack.

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Mechanical Design Engineer | Manchester | to £40K+ | ref: 8103
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M & E Design Engineers | West London | to £40K+ | ref: 2104
A growing consultancy, our client is looking for dynamic Mechanical and Electrical engineers for their already established team. This a client facing role which requires recent experience of high end residential projects.

For more information or a confidential discussion please contact Mark Butter

t: 02392 603030

e: mark.butter@blueprintrecruit.com www.blueprintrecruit.com
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Applied Energy are an innovative and progressive firm of consulting engineers seeking to expand their team of professionals based in Surrey. The company provides a broad range of consulting expertise across a diverse range of sectors providing excellent multi-disciplinary career prospects for its team. If you are seeking to develop your career in consulting, then take a look at www.appliedenergy.co.uk for a snapshot of the company's capabilities, experience, and client base. Exceptional candidates are sought for the following permanent positions:

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Contact richard.sutton@bsvconsultants.co.uk about other Design opportunities

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REF: 11225 **£30,000 - £55,000 Buckinghamshire**
A leading specialist HVAC products and solutions provider (D&B), are keen to recruit an HVAC Design Engineer who can demonstrate their experience across the pharmaceutical sector. The ideal HVAC Design Engineer will be able to work independently, be conversant with Hevacomp and have a strong knowledge of Building Services Plant, Energy monitoring, Metering and Energy saving solutions.
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REF: 11206 **West London, from £50,000 + benefits**
An established North Surrey based consultancy has created a new Principal role within their team. Due to planned growth and previous recruitment at senior & intermediate level they need an experienced individual with Commercial, Healthcare and Hi-Spec residential. This opportunity will allow the successful, preferably chartered engineer, to bring new ideas to the group offering the opportunity to impose their own management style and ideas.
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M&E - Facilities Management
REF: 11173 **W. Midlands & S. East, from £35,000 - £55,000 + benefits**
Regular readers of our adverts will recall last week's Facilities Management advert. We now have further jobs within the Facilities Management arena at HVAC/Electrical Inspector, Building Services Surveyor and Senior Client Consultant and Principal level. These roles will appeal to CIBSE approved Engineers and Low Carbon Consultants.
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Call **01483 768600** or email **contact@bsvconsultants.co.uk** to enquire about these and other vacancies.

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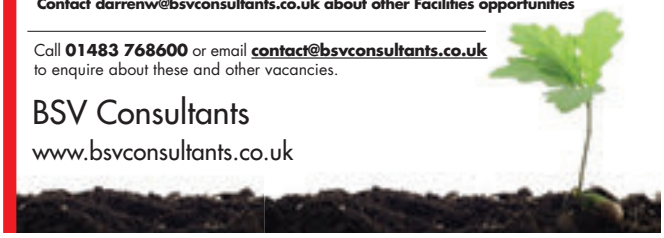

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Salary is in the range £31,671 to £35,646 depending on qualifications and experience.

Application packs are available from
http://www.admin.ex.ac.uk/personnel/jobs/E9130237.pdf
or e-mail hradmin@exeter.ac.uk quoting reference number E9130237.

The closing date for completed applications is 12 noon on 22 July 2010.

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Part of my DNA

Paul Finch describes how engineering and construction are embedded in his genes

Paul Finch was first introduced to the world of construction by his father, a builder who let Finch 'loose' on building sites during the school holidays.

By the time he left school he already had a good appreciation of what was involved in construction generally and how buildings physically went together. This experience led him to become a trainee draftsman. 'I guess engineering and construction were embedded somewhere deep in my DNA,' says Finch.

Since then he has worked his way up the engineering ladder, becoming director within the building consultancy department of CB Richard Ellis, before joining the Digital Realty Trust as mechanical design and engineering director.

In this role at the trust – a wholesale data centre provider – Finch is responsible for the design and construction of data centres. The 37-year-old explains: 'My role is technically focused but draws on my management experience. I have the opportunity to influence all pre-construction activities, from strategic planning, procurement, design and specification, through to testing, commissioning and handover of the data centre to the technical operations team, providing post-handover support where necessary.'

A typical week for Finch is hardly nine to five, his time being split 50/50 between his office in London and working on site. And when he's not officially at work, he's still on the job responding to emails: 'We have to be flexible, particularly as some of my colleagues are working in different time zones.

'At this moment it is 7:45pm on Sunday and I am travelling to our Paris data centre, where I have a meeting to chair tomorrow. Next week I'm off to Dallas, Texas.'

Finch also spends a lot of time setting the firm's mechanical

> "If you aim for the sky, you might reach the tree tops"

engineering strategy, aims and objectives, and passing the technical brief on to the professional team. This can see him deal with a vast spectrum of professionals, from mechanical and electrical engineers to solicitors.

Developing a data centre can take up to 156 weeks to complete, but because of the trust's business model, Finch can offer a data centre to clients in 26 weeks.

Finch has achieved big things in his 22-year career, but it took hard work and determination, particularly during his days as a trainee engineer at a US consultancy firm, where he worked a number of significant projects. 'During this period of my career, it was very much a sink or swim attitude, but if you did manage to keep your head above water, it put you in good stead for the future.'

Finch puts his success down to an old proverb: 'I have always aspired to be the best at everything I do. An appropriate proverb I became familiar with a long time ago was: "If you aim for the sky, you might reach the tree tops".'

Email people appointments/ role profiles to **cbailey@cibsejournal.com**

Movers & Shakers

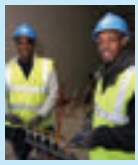
AECOM's operation in the Kingdom of Saudi Arabia (Resource Sciences Arabia) has appointed a new senior director, **Alan Morris**, to oversee building engineering. Morris has more than 30 years' experience in the building and infrastructure sectors.

Gordon Masterton OBE has been appointed chairman of the Construction Industry Council. Masterton, the CIC's 11th chairman, is vice president of environment at the Jacobs Group, a technical, professional and construction services provider.

Paul Felix, a leading figure in the UK lighting industry, has been recruited by Ex-Or to further its position in lighting management and control in the London market. Felix has taken up the role of project engineer (sales) and will join the southern sales team.

Design, engineering and project management consultancy, Morgan Professional Services, has appointed **David Rycroft** as director of business development. Rycroft moves to the position from his role as director of architectural services for MPS.

Independent metering specialist MWA Technology's business development director, **Ian Dawson**, has been elected chairman of the eastern section of the Institution of Gas Engineers and Managers (IGEM). Dawson, who joined IGEM in 1989, received the chain of office from previous chairman, Gavin Habershon, at the IGEM Eastern AGM in May.



Rowan Streete, 25, and 26-year-old **Dwayne Carbon**, who grew up together on the Rayners Lane Estate in South Harrow, have been taken on as apprentices at Kier Harrow's £42m new-build project developing Whitmore High School.

Building services provider NG Bailey has appointed **David Hurcomb** as its chief executive. Hurcomb, who is currently interim chief executive for Scotland-based Havelock Europa, will join NG Bailey in September.

Andrew Watts has been appointed as contracts manager for the north west region of facilities management specialist, Powerminster Gleeson Services. Watts, who has 10 years' experience in contracts and facilities management, previously worked for one of the UK's largest construction contractors as regional facilities manager.

The Scottish Construction Centre (SCC) has appointed a new leader. Professor Malcolm Horner stepped down as director and **David Kelly** has taken on the newly created role of senior manager. Kelly's role will include leading the SCC through the remainder of the current contract and developing a new model for the SCC beyond March 2011.

Diane Johnson, finance director with Eric Johnson of Northwich, has officially become the first female to take up the mantle of president of the ECA (Electrical Contractors Association) in the organisation's 109-year history. Johnson was inaugurated at the ECA's annual conference, held in Tenerife earlier this year. Her priorities over the next 12 months are to continue to champion skills and to raise awareness of the ECA.

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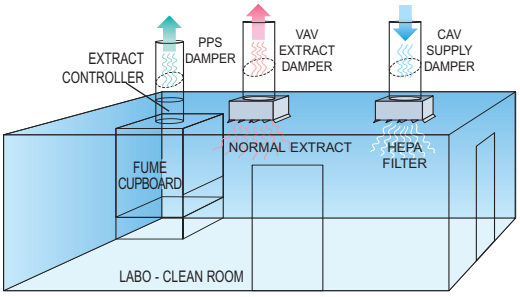

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